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A PROMISING EXPERIMENT

THE general standard of commercial food hygiene in this country is not as high as we should wish. It is not surprising, therefore, that the growth of communal feeding in school and factory canteens and in municipal and other restaurants is causing an increasing number of epidemics of food poisoning.

This is a problem that cannot be dealt with by legislation alone; nor is it entirely a question of premises and equipment. The personal habits and the technique of the individual food handler are of the greatest importance: if they are good, the chances of food and drink infections are much reduced, even where the working conditions are poor; if they are bad, the worker is a potential danger to those who consume the food he handles, whatever the conditions under which he works. It is clear, therefore, that a real improvement can take place only with the willing and informed co-operation of both managements and workers. In short, education will be more effective than compulsion.

The Guildford experiment described by Dr. Belam (page 33) is an interesting example of an attempt at co-operation. Representatives of the Local Authority and of the various food trades together examined the problem of food and drink infections in the borough; and individual firms agreed to join a guild whose members would strive to maintain hygienic codes of practice drawn up jointly by the Local Authority and the food traders. It is too early to say whether this experiment will do all that is hoped, but the Local Authority's faith is justified by the food traders' readiness to work towards a higher standard. This attempt at self-government is in line with the best traditions of this country.

So impressed is the Central Council for Health Education by the possibilities of this scheme that it is at present considering the practicability of drawing up, in consultation with the foremost medical authorities and the appropriate groupings of the food trade, codes of practice that might be voluntarily adopted by enlightened firms and their workers throughout the country. If this can be done, Local Authorities—as part of their comprehensive health-education attack on the food and drink infections—can then try to get food traders in their area to adopt and conform to the codes.

The members of the Local Authority, the Medical Officer of Health and his staff, and the food traders of Guildford are to be congratulated on the lead they have given.

Hlth. Educ. J., 1948, 6, 2—7

HEALTH IN THE TROPICS

By J. M. Cruikshank, O.B.E., M.D., C.M., D.P.H., *Assistant Medical Adviser, Colonial Office.*

Medical Officers who have devoted their lives to work in the tropics have contributed their ample share to advances in medical science. With little laboratory facilities and in the face of trying conditions they have shown real determination and great powers of improvisation in conducting painstaking research into many complex diseases. Conditions in the tropics certainly afford an unparalleled opportunity to apply modern health measures on a large scale, and offer the additional incentive that one does not have to wait long to see some benefit to health and a definite improvement in economic standards.

Our state of good health—or poor health—is influenced by all the factors which have a bearing on our mode of life, type of occupation, and environment. This wide field determines the responsibilities of a health department and demands close co-operation with other agencies jointly concerned with our well-being.

The Control of Infection

Apart from the provision of complete hospital and laboratory facilities and the control of communicable diseases, including tuberculosis and venereal diseases, measures have been designed to prevent diseases which are spread by insects, such as mosquitoes, tse-tse flies, ticks and mites. These measures include action to try to prevent the introduction of diseases into healthy territories by land, sea and air transport.

Vaccination against smallpox has been advocated by health departments and physicians for many years ; and during the past twenty years, medical research has provided inoculations effective against many illnesses which cause much invaliding and even death. To-day diseases such as Smallpox, Diphtheria, Typhoid, Lock-jaw, Yellow Fever, Typhus, Cholera, Whooping Cough and Scarlet Fever can be prevented or their gravity can be greatly diminished. It is quite probable that in the not too distant future some of the other serious invaliding diseases, many of which are prevalent in the tropics, will become preventable. Occasionally, a person who has been inoculated against a disease does develop that disease, but in such instances the illness usually runs a mild course, even when, had the individual not been partially immunised by inoculation, it might have caused death. Health services have tried to bring the knowledge of these health measures to the public notice.

To the list of diseases which are now preventable must be added those

caused by parasites which invade our bodies through insect bites. Had it not been for the modern insecticide DDT, for example, some of the campaigns in tropical theatres of war would have been impossible. In some tropical regions where both yellow fever and malaria are endemic different types of preventive measures had to be used side by side to combat the habits of two different species of mosquito responsible for the transmission of these two diseases. With the advent of DDT measures lethal to both types could be applied. This has greatly simplified control measures and by house-spraying has rapidly reduced the mosquito and infection index. Just as the liberal use of modern insecticides should not be allowed to replace cleanliness and hygienic measures in the control of cockroaches and flies, however, it should be remembered that in mosquito control it will still require sound basic engineering measures to eradicate mosquitoes permanently.

Another source of infection arises because much of the food and drink which we consume is an excellent medium on which disease germs can rapidly multiply. Outbreaks of food-poisoning have been caused by disease germs gaining access to food because those engaged in its preparation were suffering from intestinal infections, or even such unsuspected conditions as boils, infected fingers, or sore throat. For this reason supervision of handling, storage, preparation and serving of food is necessary. This is particularly essential in the tropics, where heat and moisture greatly accelerate the growth of poison-producing bacteria. Another hazard is, that, in the majority of instances, those handling foods do not have even an elementary knowledge of personal hygiene.

Lack of proper sanitation is another prolific cause of infection ; and the health and public works departments have in many tropical countries constructed modern wells, latrines, septic tanks, incinerators and compost heaps, which are available for inspection so that individuals and community councils may receive guidance in their sanitation problems. In this way great improvements can be brought about.

The health department also works closely with the public works department in its efforts to ensure a safe water supply, the safe disposal of sewage and household refuse, and satisfactory drainage in connection with insect control. Both departments are interested also in such problems as the siting of buildings and the selection of building materials to prevent, or at least minimise, discomfort associated with excess heat or cold as the climate dictates.

Various types of buildings have been constructed with a view to combating heat ; but in the tropics health authorities and engineers must avoid any type of construction which would tend to harbour cockroaches, ants or rats. Rats of course are always associated with the danger of plague.

Diet and Health

Much ill-health is caused by improper or inadequate diet. To promote growth in the young and maintain health in the adult the diet must contain a balanced variety of foodstuffs. In addition to the foods necessary for energy, dairy products, butter, milk and eggs, green leafy vegetables, and fruit should be included in our daily meals. These foods contain the vitamins and minerals which prevent the illnesses known as food-deficiency diseases which in severe forms are manifested as beriberi, pellagra, scurvy and rickets. Even if vitamins and minerals are only partly deficient in our bodies, lesser complaints such as nervousness, inflamed eyes, sore tongue, sore lips, rough skin, muscle cramp and many minor aches and pains may appear.

The problem of diet is particularly important in the tropics. In many areas the diet of the indigenous population is lacking in one or more vitamins or minerals or may be unbalanced because of an undue preponderance of carbo-hydrate. It is highly probable that much of the physical and mental lethargy of residents in the tropics is at least partially attributable to malnutrition and chronic parasitic infestation. When enlisted into the armed forces where they learned to eat a more varied diet and received treatment for chronic infestations, these very people proved to be alert and courageous soldiers.

Unfortunate as was the ordeal of those doctors and troops who were prisoners of war, this experience has brought us a tremendous fund of knowledge of the proper ratio and relationship of the various components which constitute a normal diet. It is too early for much of this information to appear in print, but it is being amassed and integrated and when published will greatly advance the scientific perspective of nutrition.

Even where malnutrition is due to custom, it can be overcome in part at least by adopting more economical methods of crop production, and by the introduction of new edible plants or grains based on soil analysis, sub-soil water level and temperature range. All these possibilities are being studied by colonial agricultural officers in their efforts to ensure that the dietary and economic level of the natives and the quality of their cattle can be enhanced. Developments in this direction are already envisaged on a large mechanised scale for tropical territories, and experiments are well under way in some tropical areas for the production of large quantities of food yeast to enrich the local dietary. In addition, to ensure that as many people as possible will benefit from present day knowledge, the Education and Agriculture departments are trying to teach young and old the influence of food on health, through school gardens, household crops, demonstrations plots and large scale farming.

Industrial Health

Now is the time to examine the opportunity for applying industrial health principles to workers in the tropics. In some tropical territories where mining is undertaken there already exist measures to protect and promote the health of the miner. However, during the war many articles and products which were previously imported had to be manufactured or processed locally, with the result that many new industries have emerged. And in those areas where water-power is available for hydro-electric installations industry will progress more rapidly.

Health schemes do exist in certain places for the benefit of plantation workers ; but to date the emphasis has been on the treatment of illness as it occurs. The trend towards prevention of disease is gaining momentum and any central recruitment or organised employment of labour on either a small or large scale in the tropics offers unprecedented opportunities to prevent accidents and occupational diseases, and to examine employees for the presence of syphilis, leprosy, tuberculosis, trypanosomiasis, malaria and the numerous helminthic infestations. Where these diseases do not prohibit employment an opportunity is then presented for supervised treatment and instruction in measures designed to prevent the spread of infections. Vaccination or inoculation against other preventable tropical diseases can also be readily carried out. Most of the work required in such a campaign can be undertaken by locally trained assistants.

Industry and Labour Departments in the past have been prone to reserve employment only for the physically fit, but experience with large numbers of workers during the war years has proved that individuals with certain disabilities can fill suitable jobs in which they may work profitably and safely. Where labour is scarce this process of job-placement means a considerable saving of man-power and contributes to the economy of the community by rendering these impaired individuals self-supporting. But apart from advising in the selection of jobs for impaired workers it is the responsibility of the health department to recommend measures which will prevent illnesses and accidents associated with hazardous occupations.

Need for Liaison and Health Education

As will be seen from the complexity of the activities designed to prevent illness and maintain health, there must be full co-operation between the health department and all other Government departments if the individual and community are to benefit to the utmost. Liaison with the labour and social welfare departments makes it possible for community gatherings, whether social or civic, to be utilised to promote health educa-

tion. Interest in personal hygiene and community hygiene and the responsibility of the individual to his community can be aroused by lectures, films, exhibitions and displays, and by wholesome relaxation in the form of concerts and sports.

It has been realised by scientific workers that there is usually a lag of from ten to twenty years between the time a discovery is made and its full approval by the general public. Health education is the only method whereby this gap can be overcome so that the benefit of discoveries in medical research can be enjoyed by the populace. In the tropics the problem is acute. But rapid progress can be made if territories will arouse their youth to become interested in health work, and if, at the same time, they will engage sufficient teaching staff to train locally recruited health workers to the maximum of their capability.

Health departments and organisations can bring the knowledge of preventive medicine and the wisdom of experience to the people through clinics, welfare centres and field workers, but it is the individual's duty to accept these benefits for the well-being of himself and his family.

To effectually perform its functions and discharge its responsibilities to the community a health department must have sufficient specifically trained staff. This applies to doctors and nurses, but equally to field workers who can follow up in the home the advice given at maternity, baby, child, school and adult welfare clinics. During the course of her house to house visits the trained health nurse can notify early cases of serious diseases and give relief in medical and surgical emergencies, or special treatment recommended by the medical officer.

Technical training of every description was drastically curtailed during the war years. This accounts for the present extreme shortage of trained health workers, which will continue for a number of years. It is therefore advisable for territories to embark on a scheme to train as many young men and women as can be recruited to the local health service. Understanding this position it is reasonable to expect that colonial governments will consider sympathetically any programme designed to train local personnel in the furtherance of health by prevention and treatment of endemic diseases.

In the early stages it will be possible to teach newly recruited local health workers how to recognise, treat and prevent maybe only one or two of the indigenous diseases, but even so, a reduction of the many invaliding diseases by prevention and treatment would be a step in the right direction. In time, as more health workers are trained and the standard of those previously trained is increased by progressive refresher courses it should be possible to bring more diseases under mass attack by locally trained health inspectors and health nurses.

The community health nurse and sanitary inspector are the backbone

of a health department, for it is through them, by precept and demonstration, that modern knowledge and healthful living can reach families in their homes and in their work, where such benefits are mostly needed.

A health department in many cases is regarded as a financial liability. It is true that many of its assets are intangible, but, nevertheless, any department which by preventing disease assists in rendering the members of a community self supporting is an economic asset. Truly, an ounce of prevention is worth more than a pound of cure.

BIOGRAPHICAL NOTES

J. M. CRUIKSHANK, O.B.E. M.D., C.M., D.P.H., Cert. Trop. Med., F.A.C.S., F.A.C.P., F.R. San. Inst.; Asst. Med. Adviser, Colonial Office; formerly Chief Med. Officer, Bahamas. During the war was Officer-in-Charge of hygiene, preventive medicine, venereal disease control, industrial hygiene; lecturer in tropical diseases, tropical hygiene, industrial hygiene, School of Aviation Medicine, Commonwealth Air Training Plan, and member of National Research Council (Canada), on Blood Plasma, Serum and Substitutes.

KENNETH BIRD (Fougasse), C.B.E., B.Sc., A.M.I.C.E.—Fellow of King's College, London, Civil Engineer, Artist, Propagandist, Art Editor of "Punch."

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MILESTONES IN MEDICINE

1. THE DAWN AND HIPPOCRATES

By E. ASHWORTH UNDERWOOD, M.A., B.Sc., M.D., D.P.H., F.L.S., *Director of the Wellcome Historical Medical Museum; Hon. Lecturer, University of London.*

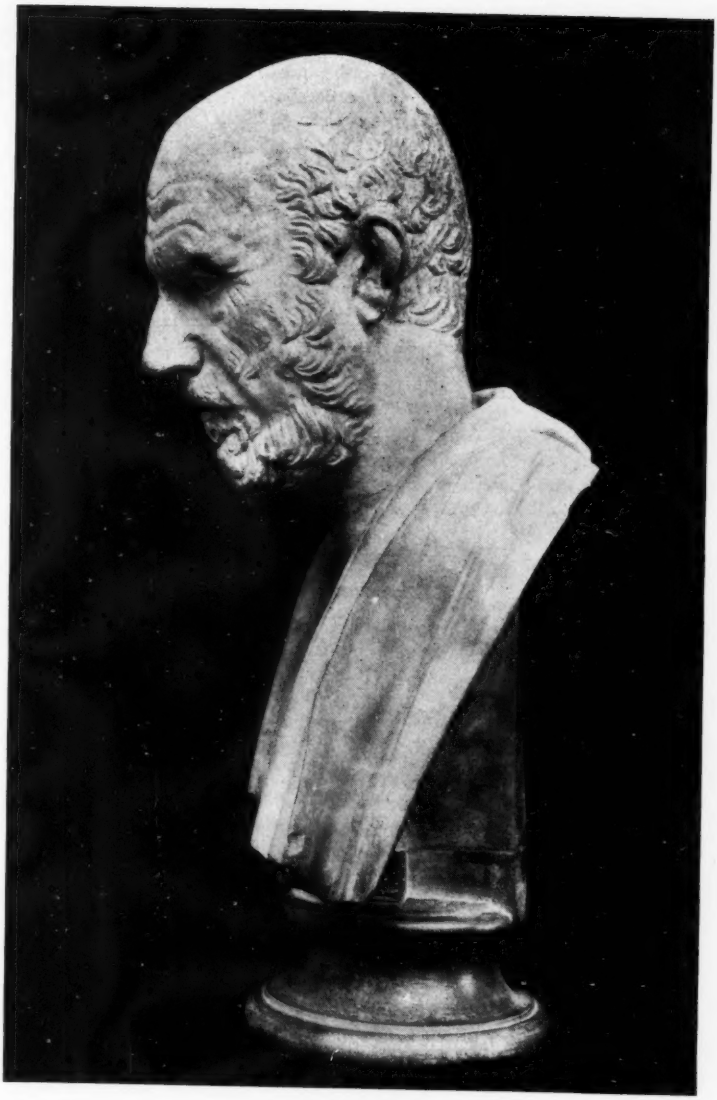
THE milestones which I shall describe in this series are not all spaced regularly along the road which has led to the present position of the art of healing and of health. There are long periods of time when milestones are few, and others when notable events crowd the scene. With these events and some of the men associated with them I shall deal, and we shall begin our journey at the first real milestone in the history of the healing art.

Some time during the sixth century before our era there arose a school of medicine in the Island of Cos. Up to the time of the shattering events in which this Aegean island was involved during the recent war, there grew on it an ancient plane tree—reputed to be that under which Hippocrates taught his pupils. Who was this Hippocrates? The reply, " The Father of Medicine ", springs readily to the lips. Having said that, we have said almost all. There is some doubt whether Hippocrates was an actual person. On the whole the evidence is that he was born on the Island of Cos about 460 B.C. He practised his art in various places in Greece, and died in respected old age about 370 B.C. The name of Hippocrates is linked for ever with the most famous body of medical writings of antiquity—the *Hippocratic Corpus*. This collection is made up of over sixty distinct works, and it is probable that their composition was spread over a period of at least a hundred, and some say three hundred, years. Hippocrates could not therefore have written all of them. What is fairly certain is that the best of these celebrated medical writings were by one man, and the assumption is that this man was Hippocrates.

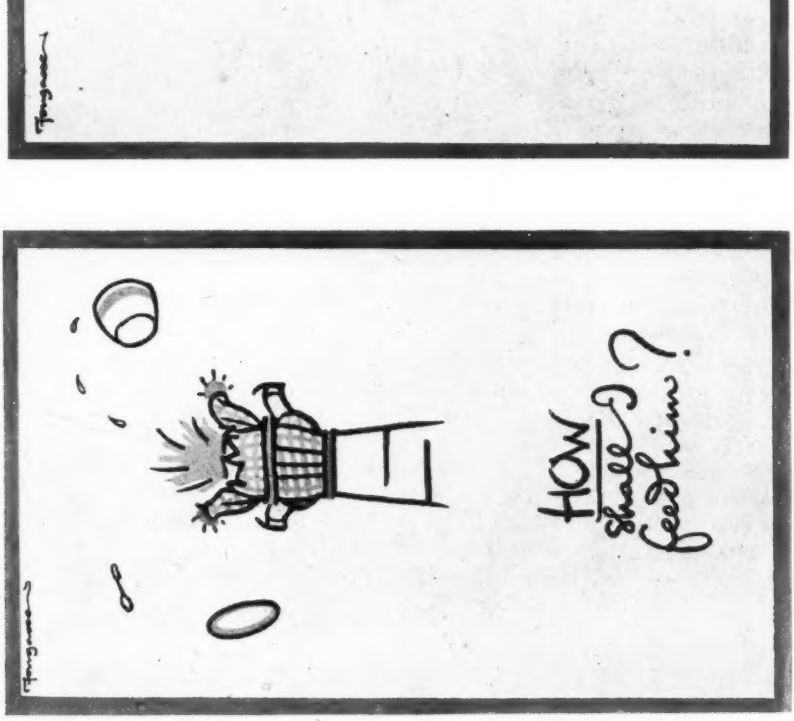
Hippocrates and his pupils inaugurated a new line of thought in medicine. Their attitude was one of antagonism to magic and to astrological influences. Their approach to disease was one of respectful curiosity. In some of these books, and especially in the *Epidemics*, we can to-day read case-histories which are set out so admirably that the diseases can be recognised from them. Hippocrates not only noted carefully the patient's symptoms ; he applied himself to the elicitation of physical signs which would help with the diagnosis. " Hippocratic succussion " and the " pleuritic rub " are examples, and his careful description of the " Hippocratic facies "—the countenance which heralds approaching death—is approached only by Shakespeare's description of the death of Falstaff. The surgical treatises are full of wisdom, and the descriptions of dislocations are especially fine. Hippocrates was the first to describe the operation for empyema.

The name of Hippocrates is associated for all time with three things, even for the layman. These are his perfection of the Doctrine of the Humours ; his *Aphorisms* ; and the Hippocratic Oath. The first gave us the sanguine, bilious, choleric and melancholic dispositions, references to which are so frequent in the literature of Europe. The second gave us such jewels as " Life is short, and the Art long ; the opportunity fleeting : experiment dangerous, and judgement difficult." The third is the Hippocratic Oath, which has been respected through all the centuries as the highest expression of the ideals of the cultured physician.

Each issue will, in future, contain a short article by Dr. E. Ashworth Underwood in the series " Milestones in Medicine."



HIPPOCRATES
(Marble bust in the British Museum)



The illustrations by Fougasse are reproductions of some leaflets and posters in the series that he has designed for the Central Council for Health Education. (See also illustrations facing pages 17 and 33.)

Hlth. Educ. J., 1948, 6, 9—13

PROPAGANDA POSTERS

By KENNETH BIRD (Fougasse), C.B.E., B.Sc., A.M.I.C.E., *Art Editor of 'Punch.'*

THE word " propaganda " is here used in its less ominous sense, and the word " poster " is used to cover anything stuck up on a wall with the object of persuading the passer-by ; for the purposes of this article, therefore, " propaganda-poster " covers everything stuck up with the object of persuading the passer-by for the common good—of persuading him to lend all his money to the State, for instance, or to keep to the left in the subway.

(Further, it may be taken as including all its smaller relations, the booklet- and leaflet-covers, whose simple object is to persuade the beholder to turn over the page and to read what's inside.)

In order to succeed in its aim, the propaganda-poster has three main obstacles to overcome : firstly, a general aversion to reading any notice of any sort ; secondly, a general disinclination to believe that any notice, even if read, can possibly be addressed to oneself ; thirdly, a general unwillingness, even so, to remember the message long enough to do anything about it.

In consequence, the propaganda-poster has obviously three main functions to fulfill :

(*a*) It must attract the attention of the passer-by ;
(*b*) It must then persuade him ; and
(*c*) It must keep him persuaded long enough to take action on it.

These three functions, (*a*), (*b*) and (*c*), differ widely from one another, and often demand entirely separate and distinct qualities ; at the same time it is evident that (*a*) is not much use without (*b*), and (*b*) is not much use without (*c*), while (*b*) and (*c*) are obviously no use at all without (*a*).

Let us therefore deal briefly with each of the three functions in turn.

To Attract the Passer-by

To attract the attention of the passer-by, naturally the first requisite is that the poster should stand out from its surroundings—if it appears merely as a part of the familiar fruit-salad of advertisements covering the walls of our stations, etc., it will inevitably waste whatever sweetness it may possess. (Too often, of course, posters seem to have been judged in the quiet and comfortable concentration of the sponsors' office—and if every poster-producing authority possessed a special testing-room,

where the new designs could be tried out under natural conditions, with gaudy competitors all round them and every form of distraction laid on, the standard might improve.)

The first suggestion, then, is that *the design should be such as to isolate it from its surroundings: it should always be well barricaded in all round.*

Secondly, and still with the object of attracting—and intriguing—the attention of the passer-by, the general visual message should be a judicious mixture of the obvious and the unobvious; say, generally, 90 per cent of the former and 10 per cent of the latter. In other words, the passer-by should always be able to see at a glance what it is about, but not *all* it is about; nine-tenths should catch his eye, and the remaining one-tenth should arouse his curiosity, so that not only is his primary attention caught, and held, but his secondary attention is called into play, too.

The second suggestion, therefore, is that *nine-tenths of the poster should be sufficiently obvious—and interesting—at a distance (both physical and mental) to induce the passer-by to approach near enough both physically and mentally to discover the remaining one-tenth.*

And that, so far as generalities go, more or less "takes care" of (*a*), save for a minor recommendation that, before issuing a poster, it is just as well to examine it to see how easily it can be defaced by small boys of any age from 5 to 50. (A very slight addition with an irreverent pencil is often sufficient to play havoc with the most inspired design.)

To Inform and Persuade the Passer-by

Turning now to (*b*) (that is to say, the persuasion of the passer-by, once his attention has been caught):

Compared to the general question of attention-attracting, this is a complex and specialised problem in which each case must be dealt with more or less on its merits, but probably the first suggestion to the would-be persuader should be the same in every case, namely—*never attempt too much.*

A poster cannot *prove* anything: it cannot *prove* to you that the safety of the State demands all your own individual savings, and it cannot even prove to you that you ought to keep to the left: the most that it can do comfortably and without strain is to bring to your notice the desirability of a certain course of action, and in many cases the most it can do is to get you to consider the matter. If it attempts to do more, if it tries to prove too much, or to protest too much, it will automatically defeat its own object (quite apart from the fatal over-complication probably involved).

And this leads to the second suggestion under heading (*b*), which is

on similar lines to the second suggestion under heading (*a*), namely, that the persuading "argument," like the primary message, should be a judicious mixture of the obvious and the unobvious. The argument of the poster should aim at taking the passer-by (who has now ceased to be "the passer-by" and has become "the reader") nine-tenths of the way, leaving the final steps to be inferred: in short, the second suggestion is that *the reader should be allowed to reach the final conclusion by himself.*

This type of approach will very often avoid that stubborn resistance-to-persuasion that over-conclusive moral lessons usually evoke. Moreover, the reader is much more likely to absorb and retain a lesson that he has had a hand in himself: present him with a *reductio ad absurdum*, for instance, in which the final steps are left for him to discover for himself in a flash of self-illumination, and he will become a party to his own persuasion.

To Hold the Passer-by

We now arrive at (*c*) (how to keep the reader persuaded long enough to take the necessary action):

The first requisite in any attempt to induce the reader to carry an idea away with him is clearly that he should not be given too much to carry away: that is to say, the idea of the poster *must be* in simple terms. (It is obvious, in any case, that unless the idea is one that the reader can describe to himself in a few words, he is hardly likely to keep it in his memory for long, even if he wants to.)

For the same reason it is equally important that there should be only *one* idea, too. This may sound easy and self-evident, but it is, in point of fact, strangely difficult to bring about: to ensure that the poster conveys no more than one idea to the reader, and that one a palatable and appealing idea, is no mean task—and there is always the temptation to add unnecessary material in an endeavour to make the affair more amusing or attractive or noticeable.

The addition that is made may well be successful in this and still be out of place: it may, in fact, help quite a lot with (*a*), and even with (*b*), but at the same time remove any chance of surmounting (*c*), which is, of course, the object of the whole affair.

Thus, the first suggestion under heading (*c*) is that *the idea of the poster should be as simple as possible—and never more than one.*

The second suggestion under this heading is again on similar lines to the second suggestions under (*a*) and (*b*), both of which recommend that the reader should be made to do some of the work himself. In this case it is in the actual treatment that the reader's collaboration is suggested—

and the suggestion is that, whatever the treatment employed, *something should always be left for the reader to " fill in " for himself.*

This undoubtedly assists him to carry the picture away in his memory, and in flattering his imagination, it flatters itself: in support of the suggestion, one might quote the fact that readers, describing a favourite drawing, will frequently indulge in superlatives over, say, the superb expression on a certain face, when in actual fact that expression really consisted merely of one dash and a dot. It is not, of course, the drawing that they remember with pleasure, but their own " fill-in."

This provides one of the arguments in favour of the employment of so-called formula-figures—that is, of figures that do not bear any naturalistic resemblance to real people: the features of such formula-figures are easily idealised in the memory and moulded to the reader's own satisfaction ; they do not, like naturalistic features, remain obstinately defined and " factual."

Another argument, incidentally, in the same direction is the fact that although a figure drawn with what we loosely describe as photographic accuracy may certainly seem to be " true-to-life " and to " look like a real person," actually it can only truly look like *one* real person, and that one probably not at all like the reader whom it is trying to convince!

If, on the other hand, the figure is drawn in a " formula " style, it is quite evidently a symbol for humanity in general (or some section of it): it can stand for " everyman," for anybody and everybody, and that naturally includes the reader himself.

The Value of Humour

That brings us to the subject of humour and its employment in propaganda: and, since propaganda usually treats of affairs of deadly seriousness, the advisability of seeming to treat such matters lightly might be called in question.

Actually, of course, humour has nothing whatever to do with being funny at the wrong moment, or on a subject that should not be jested about: such is, in fact, the opposite of humour. The function of humour is essentially corrective: it is a corrective, for instance, of incongruity and of faulty proportion—so that it is just as much a corrective of unseemly levity or flippancy as it is of unseemly solemnity. In any case the province of humour must be to help us more in foul weather than in fair ; were it only to function among things of small importance we should be in a very bad way.

What, then, is the difference between " humorous " propaganda and " realistic " propaganda? As I see it, the function of realistic propaganda is to stop you putting your hand in a circular saw by showing

you just what happens when you do so: the function of humorous propaganda, on the other hand, is to correct, by implication, the state of mind that prompts you to put your hand there at all.

Realism states a fact, "If you *do* this, it leads to that": humour, with its naturally wider net, says "If you *behave* like this, it leads to that."

Where the realistic necessarily means the horrific, as it very often does, the advantage of humour is considerable—for anything unpleasant naturally causes an automatic closing of the mind against it, since minds, like eyes, are provided with long protective eyelashes. You may possibly, and inadvertently, be tricked into looking at a horror-poster once, but you will stop doing so as soon as you recognise it for what it is: horror shuts your mind in self-defence, and the more efficient the horror-content the tighter and quicker it shuts it.

Humour, on the other hand, aims at opening your mind, and the better the quality of the humour the wider it opens it.

Horror's lesson is a single distasteful shock—it may admittedly have a startling primary effect on the reader, and this primary effect may be twice or even ten times as great as that of humour: all the same, the latter has, I am sure, a thousand times as many chances of getting past (*a*), and through to (*b*) and (*c*)—that is to say, *of persuading the reader, and keeping him persuaded.*

One final argument, and a very simple commonsense one, in favour of the humorous approach:

The propaganda-poster has to get its message across to as many people as it can; however good it is, it can't do much if it isn't seen. It has therefore got to be displayed as widely as possible.

Now, in a totalitarian state this is presumably easy—a "directive" is issued that the poster is to be displayed everywhere, and displayed it is: in comparatively free democracies, however, this is neither practicable nor desirable.

For wide distribution and display, therefore, the success of a propaganda-poster is dependent on the good will of people in general—on the readiness, for instance, of factory-managers, hotel-managers, shopkeepers, etc., to stick it up in their establishments.

Now it is obviously not wise to ask the owners of teashops, restaurants or public-houses to put up horror-propaganda for their clients' comfort, nor is it much use to ask shopkeepers to entertain their customers with gruesome pictorial warnings—if given the choice between realistic and humorous, they will naturally almost invariably choose the humorous, and, if given a selection of both (which is usually the case), it is the humorous that they will always actually display.

Reprinted from *A School of Purposes*, a Collection of Fougasse Posters, 1939–45 (Methuen, 10s.6d.).

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POSTURE

By A. B. Appleton, M.A., M.D., M.R.C.S., L.R.C.P., *Professor of Anatomy, in the University of London, at St. Thomas Hospital.*

What is it that determines the way in which an individual stands, sits or lies? In general terms it can hardly be doubted that the postures we adopt are those which give the greatest sense of comfort, which relieve fatigue or which seem most convenient for doing whatever is in hand. Now we are all endowed with different ' anatomies '. In the first place the general proportions of the various parts of the body differ: the mechanical problems involved in standing therefore differ accordingly, and the positions which we adopt for sitting or lying are likewise influenced. Secondly, our sense of comfort in a posture is influenced by the muscular tension involved in the posture. Thirdly, each bone in the body shows individual variations in shape ; the feature which more than any other has an influence on posture is the torsional form of the long bones, a feature which shows itself in the relative orientation of the two ends of a bone. Torsional differences are indeed so great (commonly in the range of 20 to 30 degrees) that there is no possibility of all people standing in an identical fashion. Taking the lower part of the leg as an example, the tibia has in some persons a torsional form such that its lower end (and the foot) faces approximately in the same direction as the patella whereas in others its shape is such that the foot is directed outwards and forwards when the patella faces forwards. These persons cannot all stand in the same way in respect of feet and knees simultaneously. Attempts to do so result (in the first group) in displacement between bones in the foot, with a coincident undesirable flattening of the arch of the foot.

Other considerations, however, are also involved in our postural peculiarities. A certain way of standing may be adopted deliberately in order to follow some fashion of the moment, or a particular way of standing may be imposed as a part of some comprehensive scheme for physical improvement. The very tall man and the very short tend to certain idiosyncrasies of posture, the former stooping to bring himself in touch with his fellow men, the latter holding his head well up. Or certain peculiarities of posture may develop as the outcome of unconscious imitation, especially in children. We must also bear in mind that painful conditions have an effect on the way we stand ; the simple corn on a toe frequently produces far-reaching changes in the standing posture.

In a different category are those postural habits which are acquired when the muscles used for controlling positions are too weak. It is in this way that ill-nourishment tends to effect our posture ; even a general

lassitude or mere negligence in the use of our muscles has a similar result. Postures indeed reflect our general state, whether it be a sense of well-being or a condition of ill-health, either physical or mental. Fatigue is sufficient in itself to produce a noticeable change of posture.

Now it is important to distinguish between those features of attitude which are caused by disease, of which they are sometimes the first obvious indication, and those which mainly involve a change in the relative position of healthy parts. It must be emphasised that malposition caused by disease requires diagnosis and treatment at the hands of the physician or surgeon. Knock-knees is sometimes a condition more serious than mere malposition of healthy bones ; and a persistent flexion of the hip points to the need for medical examination. On the other hand ' squinting ' knees, flattened arches to the foot or a misshapen back may in an early stage be a mere malposition arising from muscular slackness, and may thus be suitable for direct remedial treatment.

The Development of Posture

Children no sooner begin to move about than they develop idiosyncrasies in their movements and attitudes. Every movement is a succession of postures, and differences in the way a child carries out movements make their appearance early. We all soon get our own way of doing things. These idiosyncrasies are due partly to individual differences in the hereditary make-up. The mechanical problems are different for the stocky (pyknic) type and for the slender (leptosomatic) type. Some muscles will in different children be relatively stronger than others, and the intrinsic pattern of co-ordination, dependent on the nervous system, will also vary.

Upon the basis of individual differences, which may be comparatively small, children build up patterns of postural habit of great diversity. Posture is in the functional sense largely the product of habit. New habits are readily acquired throughout childhood and even by the adult. The more often we lie flat without a pillow, the more comfortable we feel it to be. A deliberate change in the tilt of the pelvis which at first feels awkward will in time become comfortable and a new postural habit is thereby acquired.

The first steps of a child on its two feet represent no mean acrobatic feat, with so many movable parts requiring to be balanced one above the other. It is little wonder that different children effect it in different ways. So long as the child gets about or crawls about somehow, he feels he has achieved his aim ; his end justifies the means. Complications arise when muscles prove weak in relation to the demands made upon them. This may be a simple result of fatigue : even a strong child may get overtired. Some children on the other hand have relatively weak

muscles and the forces of gravity arising from the body weight may prove too great for them. They may develop a ' squint ' of the knees owing to failure to control position, a common cause of the ' pronated ' foot (see illustration).

The posture of the strong healthy child differs from that of the adult. A considerable hollow in the small of the back is entirely appropriate to children a few years old, but in the same degree it merits the label ' lordosis ' in an adult, with implication of malposition. In this sense it cannot be called a lordosis in the child. The child indeed differs greatly from the adult in the proportions of its limbs and body, as also in the distribution of bodyweight: the abdomen and head are relatively large. As growth proceeds the abdominal wall flattens, the front of the pelvis (pubis) is drawn up to a relatively higher level (the pelvis thus becoming less tilted forwards) and the lumbar concavity thus becomes less evident. Failure to show appropriate age-changes is a major postural fault.

Consequences of Postural Idiosyncrasies

Early idiosyncrasies of posture leave their mark within the body. The very shape in which bones grow is not determined entirely by hereditary influences: it is influenced also by the postures adopted during the growth periods (it is well known that an early start has to be made in the training of acrobats). If the child habitually goes in for general activities that involve good range and variety of joint movements the muscles and ligaments that cross joints will allow proper freedom of movement. If, on the other hand, general and varied activities are neglected, shortening of muscles and ligaments occurs and joints suffer a loss in the range of possible movements. If for any reason certain movements are restricted, no matter how much exercise is taken in other directions, the muscles and ligaments that are seldom stretched get tight across the joints. Ligaments shorten and muscles lose some of their capacity for elongation. Thus a movement that is neglected gradually becomes lost. When we have occasion to adopt postures in which certain joints are at their extreme range of movement we become unnaturally stiff, for example when sedentary people try to stand upright: grace of attitude and of movement requires that there shall be a margin of mobility.

Restriction of movement, stiffness and a liability to ligamentary stress constitute the penalty we pay at any age for keeping to a limited range of postures and movements.

Damage to joint structures occasionally follows abnormally great mobility: viz. when muscles controlling joint movements are weak. Joint structures including ligaments are ordinarily protected by the development of tension in the muscles about the joint. If these are not acting strongly enough any sudden movement may strain the joint struc-

A. Squinting knees associated with pronated foot. The instep bulges (evident in the prominence of the navicular bone).

B. Same subject deliberately increasing the squint of the knees (patellae almost touching).

C. Same subject deliberately 'unsquinting' the knees thus raising the instep. Secondary changes in the pronated foot show themselves in the position of the great toe.

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tures. Such injury may occur, even in persons with good physical condition and posture if a violent movement is performed in circumstances that leave the joint without adequate muscular protection.

An important aspect of posture is the desirability of changing it from time to time throughout the day. An adverse influence of standing immobile is an embarrassment of the return of blood to the heart, especially after exercise in a warm atmosphere. But attention will be directed here rather to certain long-term effects of ' maintained posture '.

What is the effect of losing mobility or keeping to a limited range of positions and movements? Adverse effects follow principally because the different natural postures of the body such as sitting or standing require different postures at our various joints. These ill-results show themselves less in the habitual position than in those which are less habitual, since if we hold mainly to one position we become less able to attain others without developing abnormal postures. We need to keep sufficient mobility to be able to adopt good postures in all our varied activities, whether sitting, standing or even moving about.

Now everyday life presents problems in this respect since many of us have to spend considerable periods of time more or less in one position —standing, it may be, or sitting. The problem arises in its most acute form for those who must take to bed for a time. Under any of these conditions changes inevitably occur which restrict our mobility if we do nothing to retain it. First we get shortening of certain ligaments. Secondly certain muscles lose some of their capacity for elongation. Thirdly, on account of the weakening of various muscles that get no exercise, we become still less able to do anything but ' stay put ' and even the muscles we are using may get so tired that we slump into worse positions.

Loss of mobility tends therefore to abnormal postures. From time to time we shall be likely to move some of our joints to their very limit, and ligaments and muscles then undergo strain. Fatigue and pain may develop. Ligaments and their long attachments become painful from being pulled upon. Different degrees of malposition are needed to produce the pain in different people and the existence of pathological conditions vaguely classed as ' rheumatic ' appears to render them more susceptible. Further, muscles may go into painful spasm if joint structures are strained. Muscles also become painful if maintained too long in a fixed position (e.g. the dentist's back), and it has been presumed that the blood supply is interfered with. Again, we may adopt positions that lead to pressure on the skin of some part of the foot greater than it is fitted to bear and painful thickenings then develop. In extreme lordosis it is said that painful pressure sometimes occurs between bony points in the back. Loss of mobility thus brings various kinds of disability in its train.

Indirect Consequences of Postural Restriction

The disabilities that follow restricted movements are not confined to the joints primarily concerned. They will be discussed briefly in respect of three positions which are sometimes maintained too continuously: standing, sitting, or lying.

Standing. Two of the commoner effects of standing about will be noticed. The small of the back tends to get hollow in many people, and the knees may begin to ' squint '. The hollowing of the back is produced by a forward tilt of the pelvis (permitted by relaxation of the rectus abdominis muscles). Squinting of the knees follows relaxation of the lateral rotators of the hip and of the tibial muscles (invertors of the foot). As a result an undesirable form of flattening of the long arch of the foot follows inevitably (seen in a bulging of the instep) in consequence of the mode of construction of the joints of the foot, leading to a disordered posture of the foot known as ' pronation '.

Sitting. If we have to sit a great deal the small of the back tends to flatten or even to become convex backwards ; the lower part of the neck gets bent forwards and the shoulders move forwards.

The adverse results of permitting these flexions of the vertebral column to become habitual are not confined to the development of pain in the back. A good standing position is attained only with difficulty ; and a new combination of joint positions develops unconsciously, determined by the need to maintain the line of gravity over the feet and to keep the face (and eyes) looking approximately horizontally. The requirements of balance over the narrow base provided by our feet lead to readjustments of posture literally from head to toe. The most characteristic is a ' forward carriage ' of the pelvis, that is, a forward displacement which is effected chiefly by means of a movement situated in the ankle joint. The enfeebled musculature of the back is relieved from work by this position. At the same time the centre of gravity is carried well forward and it is thus possible to sway back the trunk by a movement of extension at the hip joint ; the face, instead of looking downwards as it would if no postural adjustment were made, is thereby brought into a horizontal position. This ' orthoptic adjustment ' as Fick called it, is commonly aided by a tipping back of the head on the neck, producing the effect often called ' poking chin '. There is a false appearance of uprightness with partial concealment of the abnormal posture of the back.

The sequence of changes extends to other parts of the body. Attention may be directed to one that affects the feet. In spite of the back-sway of the trunk the forward carriage of the pelvis tends to displace the bodyweight further forwards on the feet. Disability of the foot is then liable to develop, arising partly from the undue proportion of the weight which thus falls on the forepart of the foot, and partly from the relative

weakness of muscles in the sole of the foot which get little exercise in a sedentary occupation. Ligaments in the fore-part of the foot are placed under strain and pain develops ; the skin may develop corns or calluses. Nor are the effects of abnormal posture in the sedentary confined to peculiarities of the standing position. They affect the way we walk, for example, by reason of the limited capacity of various muscles for the elongation needed in natural movements.

The disabilities described above belong to a category sometimes called orthopaedic that is they concern the ' locomotor ' apparatus with which we hold ourselves up and move about. There are many other disabilities which have been attributed (with varying degrees of probability) to a forward bend at the base of the neck and a resultant sagging of the chest wall and diaphragm ; but the arguments are largely based on *a priori* considerations. These supposed consequences range from visceroptosis with impaired digestive functions or constipation to vascular congestion of pelvic viscera and even in the male, chronic prostatitis. But the full implications for visceral function of these displacements remain equivocal at present.

To correct the postural peculiarities that arise in sedentary people we have to direct our chief attention to the principal initial cause of trouble, the undue flexions of the vertebral column.

Lying. Those who have to lie in bed for long periods undergo both a general weakening of muscles and a restriction of certain kinds of joint mobility. A few of the tendencies for which counteracting movements are required may be mentioned : a constant twist of the neck in one direction (for this reason we should avoid placing a child's cot next a wall), a forward position of the shoulders, an inverted foot and, a pronated forearm with the palm of the hand resting on the bed.

Taking Avoiding Action

Much attention is now being given to the needs of those whose life tends to stereotyped postures, or movements. In general we should encourage the performance from time to time of movements that undo the harm caused by stereotyped positions. (The short break between lessons in schools is for this reason alone a prime necessity). *We should deliberately assume positions we are inclined to neglect on account of our habit of life.*

Standing. Those who stand a great deal need to attend to the postures of the knees and the back. Much of the trouble that occurs in feet is avoided if the knees and back are in good posture. From time to time, then, we should rotate the knees outwards while keeping them straight : this has the effect of pulling up the instep on the inner side of the foot (fig. C). The excessive curve of the back (lordosis) can be helped if we ' tuck in the tail ' lifting up the pubis (or front of the pelvis). Sagging

of the viscera can be minimised by seeing that the lower part of the abdominal wall, close to the pubis, is not allowed to bulge.

Sitting. The worst effects of long sitting can be minimised if we consciously attempt to escape the special tendencies involved. If we sit well back it will help us to keep the small of the back hollowed ; and the thighs will thus be well supported. The forward crouch should be avoided. Eyesight should if necessary be properly corrected with glasses and if there are disturbances of co-ordination in eye muscles (a frequent cause of eyestrain) orthoptic treatment should be given.

Owing again to the tendency to have insufficient general exercise those who lead a sedentary life should deliberately embark on moderate amounts of exercise in small repeated doses ; but they will not get unmixed benefits from a single day of gruelling physical activity once in the week.

Minimisation of the special consequences of immobilisation in the temporarily bedridden needs skilled guidance with due regard to the weakening of thigh and buttock muscles, the risk of shortening of anterior shoulder and forearm pronating muscles and the risk of malposition of the feet.

Before leaving this subject we may notice that similar considerations in regard to retention of all ranges of movement apply to those who indulge in highly specialised activities. These sometimes involve some limitation in variety of posture and movement. ' Naturalness ' of movements of other kinds will then tend to be handicapped. Thus the enthusiast in some special field of activity, while thoroughly efficient in his own line, may seem awkward and even stiff under other circumstances.

Standards of Posture

Standards in the past have been set in a variety of ways. They have sometimes been based on the average appearances of healthy young people. Often they have been based on, or at least influenced by, aesthetic considerations. Sometimes they have been frankly empirical or based on *a priori* considerations.

Standards have changed from time to time principally when some accepted standard has been suspected of leading to disability or inefficiency. Thus the out-turned feet of a generation ago and the flatback of more recent times have each come under criticism, and accepted standards of posture have been accordingly adjusted.

The most satisfactory approach lies in the setting of limits beyond which there is some specified risk of disability ; thus defined the precise limits would not be the same for all ; but clearly some compromise would be convenient for general use. Assessment of position on this basis will be a field of work for the future. *Strict insistence on conformity to a posture defined within narrow limits is unjustified,* if only because on the

one hand, we are all different anatomically, and on the other hand we are leading different kinds of lives.

Complete abandonment of discipline in the exercising of children is also open to criticism. Children if left entirely to themselves in the performance of movements will be likely to perpetuate their own idiosyncrasies. A movement will be performed in the easy way and this will of course be the one that avoids the joint movements which are already restricted, and avoids the employment of muscles that have been neglected. Guidance with discipline thus remains an essential feature of physical education.

Many figures have been published regarding the incidence of postural faults at various ages, but the majority do not lend themselves to very definite conclusions. Some of the measurements have not been sufficiently well devised to throw light on the nature of the postural change. Others, carried out by a diversity of observers are not comparable because the measurements are not strictly comparable. Lastly, even when comparable figures from suitable measurements are available, their interpretation in terms of ' correctness ' has been largely a matter for individual opinion.

In recent years some have claimed that over 90 per cent of children have defective posture, because very close conformity to an arbitrarily fixed standard is demanded. Others interpret correctness more liberally and get more moderate frequencies for defects of posture.

The following conclusions are well supported. Squinting knees and pronated feet frequently develop in children of two or three years old. Displaced toes, including hallux valgus, are already common by the age of four. Ten to twelve is the age for a considerable increase in the number of forward shoulders, forward bending of the lower part of the trunk and lateral and rotatory curvature of the vertebral column. From 13 onwards kyphosis and ' poking chin ' are more frequent. ' Forward carriage ' makes its appearance with increasing frequency from adolescence onwards into middle age.

Lordosis must be considered in a separate category since the degree of hollowing of the small of the back seen in the very young is to be expected to diminish greatly between four and ten years. If it persists we are entitled to call it a ' lordosis '—by this term meaning an abnormal posture.

Because of the early age at which some postural faults develop, and the effects these have on the shape of skeletal development as well as on the condition of muscles and ligaments, *it is of the greatest importance that an important postural deviation should be recognised early and dealt with appropriately* before these changes can take place. Wide variety of movements and postures with adequate exercise for building up the muscles is to be regarded as preventive or prophylactic.

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THE CITY OF LEEDS HEALTH EDUCATION CENTRE

By John F. Warin, M.D., D.P.H.,
Deputy Medical Officer of Health, Leeds.

In the Journal of April 1947 a brief description was given of the new Health Education Centre which had then just been opened under the auspices of the Leeds Committee for Social Hygiene and Health Publicity. The Centre has now closed after a run of six months and it is thought that a fuller account of this experiment would be of general interest.

The premises, which were centrally situated, comprised a ground floor room with extensive shop window space suitable for display purposes, and a basement cinema capable of seating fifty persons. The Centre was opened by the Lord Mayor of Leeds on the 10th January, 1947 and was open daily except for Sundays and Mondays until it finally closed on the 28th June, 1947. During this period twelve separate fortnightly displays were organised covering between them a wide range of important health topics. Films relating to the subject matter of each particular display were shown in the cinema at approximately hourly intervals, each programme lasting about forty minutes. The Central Office of Information supplied the cinematograph apparatus, a technician and many of the films, all free of charge. A full time supervisor was appointed and in addition each organisation responsible for the displays provided a number of volunteers to help to staff the Centre. The hours of opening were originally fixed from 1–9 p.m. but owing to the very poor attendance in the evenings these were altered to 10.30 a.m. to 6 p.m. on Tuesdays, Thursdays and Saturdays, and 12 noon to 8.30 p.m. on Wednesdays and Fridays. The following methods of publicising the Centre were used—Display bills on trams and buses, posters, leaflets, cinema slides, press articles and a franking machine slogan. Full particulars of the Centre were sent to all general medical practitioners in the city, to all members of the Clergy and to the managements of a number of the larger industrial establishments in the city. Communications describing the Centre were also sent to the University, to Youth Organisations and through the Director of Education to all schools.

The cost of the Centre has been approximately £750 made up as follows: Adaptation of premises £350, Running costs, i.e, rent, rates, gas, water, electricity wages £345, Publicity £50, Incidental expenses (carriage, insurance, etc.) £5.

The Centre attracted considerable attention not only in the city but

also throughout surrounding districts. A record of attendance was kept and altogether the Centre was visited by 24,990 people, or an average of 208 per day. Very many more stopped to look at the window displays and probably learnt something useful. The cinema shows were attended by 6,726 people or an average of 56 per day. The actual detail of the attendances at each display is set out in the following table.

		Attendance.	
Title of Display.	*Organisation Responsible.*	*Display.*	*Film Show.*
Healthy Babies.	Leeds Babies Welcome Association.	1,836	836
Healthy Homes.	Public Health Dept. Sanitary Section.	992	387
Prevent T.B.	Public Health Dept. T.B. Dispensary.	1,316	652
Exercise and Health.	Central Council of Recreative Physical Training.	1,436	773
Prevent V.D.	V.D. Dept. Leeds General Infirmary.	488	228
Healthy Children.	School Medical Department. ...	1,471	860
Prevent Infection.	Public Health Dept. Inf. Dis. Section.	528	207
Food and Health.	Ministry of Food, Divisional Office.	603	248
Your Teeth.	School of Dentistry and Army Dental Corps.	4,877	801
Nursing.	Public Health Dept. Hospitals Section.	8,528	847
Your Eyes.	Blind Welfare Dept. and Northern Counties Association for the Blind.	1,296	373
Mental Health.	Mental Health Services Dept. ...	1,569	514

Much useful experience and information has been gained and it may be helpful to others planning along similar lines to set out some of the conclusions reached.

Premises

The premises fulfilled the principle basic requirements, namely a room for staging a display, adequate window space to attract the attention of passersby and a room for cinema shows, but the actual layout was not ideal. The display room itself was not large enough to allow the public to move around freely and it would have been an advantage to have had separate doors, for entry and exit. The window area fronted partly on to the main street and partly on to a side street and it had been hoped to make full use of all this window space. But it was found in practice that very few members of the public ever glanced at the side windows and it would have been better to concentrate entirely on the main window in setting out the displays.

Displays

The displays varied a great deal in character, but it was obvious that those which attracted most attention consisted largely of models rather than the more familiar charts, posters, photographs, etc. The most successful display was that devoted to " Nursing " and this consisted of

a life size model of an operating theatre with modern operating table and instrument trolly ; patient, surgeon, anæsthetist with apparatus, nurses, blood transfusion in progress, etc. This display also included a patient in an iron lung and a tracheotomy case. During the eight days devoted to this particular subject the Centre was attended by over 8,000 persons and it was literally crowded out. The next most successful display was that under the title of " Your Teeth " and here again models and dental apparatus were set out in a very attractive way. It was soon realised how important it was to have a striking display in the main window in order to compel the attention of the passerby and so stimulate his curiosity that he would come inside to see the remainder of the show which should, of course, be worth coming in to see. Once a few people were attracted inside by the merit of the display others soon followed.

Hours of Opening

The following table is an analysis of the percentage of the total attendance on an hourly basis.

			Period					
10.30—	12.0—	1.0—	2.0—	3.0—	4.0—	5.0—	6.0—	7.0—
12 noon	1 p.m.	2 p.m.	3 p.m.	4 p.m.	5 p.m.	6 p.m.	7 p.m.	9 p.m.
Attendance at Display								
Percentage of Total								
8.2	14.1	19.3	16.4	17.0	12.8	7.2	2.0	3.0
Attendance at Film Shows								
Percentage of Total								
5.0	7.2	21.0	16.5	22.6	14.3	5.2	5.3	2.9

The best hours for attendance were between 12 noon and 5 p.m. and the obvious conclusion to be drawn is that visitors to the Centre were primarily drawn from passersby attracted by the window display and this serves to emphasise one of the fundamental requirements of such a Centre, namely, that it should be situated in one of the busiest thoroughfares.

Publicity

Although publicity was encouraged in a number of ways it was found that the merit of the display in the Centre itself was the greatest factor in influencing attendance.

It is very difficult to estimate the success or otherwise of a health education experiment of this nature. Attendance figures can only be a guide, the true value being the volume of useful information disseminated either directly or indirectly throughout the community. For instance one person such as a mother or teacher may ultimately as a result of a visit to the Centre improve the health and welfare of a whole family or school. The Committee have no doubt that the Centre has been most successful and the experiment well justified.

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SUBLIMATION AS A FACTOR IN UPBRINGING

By Anna Freud, *Practising Psycho-Analyst, Member of the British Psycho-Analytical Society, London.*

The Role of the Instinctive Forces

Investigations into the phases of development of human individuals have emphasised the fact that the child begins his existence as an instinctive being. The forces which play the main part in his early life are his primitive needs. Hunger, the first components of the sex instinct, and aggressive and destructive tendencies seek for expression in his behaviour. When one of these instinctive wishes is satisfied, the child experiences relief and pleasure. When satisfaction is withheld by the environment and the wish is frustrated, the child suffers from the resulting tension, which is experienced as a painful state. The avoidance of such pain and the search for instinctive pleasure govern the infant's behaviour. It takes some time before the small child, under the influence of experience and through the emotional contact with his environment, develops other parts of his personality with other aims and interests in life.

Parents—and other workers with children—who become acquainted with these facts are thereby relieved of one of their great concerns. They used to wonder whence were derived the many attitudes and qualities of young children which seemed undesirable to them: the greed and possessiveness of the infant, the small child's interest in dirt, his tendency to show off, his sexual curiosity and indiscretion, his destructive actions. They sometimes attributed them to bad example set by adults or other children, sometimes to seduction. Or they blamed their methods of upbringing as inadequate since they failed to make the children come up to their own standards of moral and socially adapted behaviour. But they need no longer search for accidental or incidental causes if it can be proved that all these apparent vagaries of infantile behaviour are the result of the inborn urges of sex and aggression, the orderly development of which can be traced through consecutive phases of organisation.

New Problems

The relief gained from this new insight into the child's nature is on the other hand counter-balanced by the setting of new and puzzling problems. Parents begin to realise that certain qualities and activities

are the inevitable outcome of the child's aggressive nature ; that other attitudes are invariably bound up with the reaching and passing through of certain stages of sex development ; that the so-called ' bad habits ' of childhood such as thumb-sucking, masturbation, nail-biting, etc. are not the unhealthy and dangerous practices which they were formerly believed to be, but ways and means by which the child attempts to gain erotic pleasure from his own body before his sex interests turn more fully outwards to the loved adults in his environment. But it is one thing to accept the truth of these statements and a different matter to apply the new knowledge to the actual, detailed handling of children. If most of the child's so-called naughtiness and nearly all his bad habits are legitimate expressions of the most important life forces within him, then certainly it may prove disastrous for the normality of his development if these outlets are closed by conventional restrictions, his demands for instinct satisfaction thwarted, and standards set up which are directly opposed to his natural primitive urges.

Some of the work done by psycho-analysis on the neurotic disorders of children and adults has become common knowledge and has done much to heighten the anxiety of parents in this respect. Severe suppression of thumb-sucking and greed has been shown to lead to eating-disturbances ; the enforcement of clean habits to stubbornness or to obsessive attitudes such as exaggerated tidiness, lack of generosity, disgust for all matters pertaining to the body functions. Frustration of the child's wish to show off his naked body produces excessive shame and awkwardness ; where the child's crude attempts at love making are rebuffed, feelings of shyness and impotence may arise in later life. In short, many parents understand the crippling effect of prohibition, restriction and frustration as methods of upbringing: under their pressure the child turns away from his own inner urges, represses them from his consciousness and thereby loses much of his spontaneous activity and joy in living.

Self-Regulation Or Educational Guidance—A Dilemma

In recent years some parents have attempted not to interfere with the instinctive urges of their children, in the hope thereby to prevent anxieties, inhibitions and neurotic symptoms. Such a regime has proved helpful where eating is concerned: infants and small children have shown surprising powers of self-regulation when left free to choose their own food according to kind and quality. A less exacting demand for good manners has also done much to decrease the incidence of eating-disturbances. And a more tolerant attitude to dirtiness, and the postponement of habit training to the second year of life has had beneficial results for the child's character formation. On the other hand it has proved impossible to

satisfy the various components of infantile sexuality which are by their nature insatiable and incapable of being gratified in a normal present-day environment. Weaning from the breast is felt, by certain children, as a severe deprivation, however late it happens. No child in a family can ever possess the mother to the exclusion of all rivals. The presence of the father gives rise to intolerable jealousy in the boy. Comparison with the superior strength and power of the parents inevitably produces in the child feelings of inferiority and impotence. Even where parents are willing that their children's aggressions should be directed against themselves and their possessions, the scope which the real environment offers for aggressive and destructive activity is not wide enough for the intensity of the infant's and toddler's tempers, hates and rages. Worse than that: neither the child's pre-genital sex urges nor his early destructive reactions ought to survive his first four or five years of life. Without curbing his aggressions, limiting his egoism and controlling his sex urges, the child remains unfit to mix even with his contemporaries. But this transformation of instinctive urges which is necessary if he is to become a useful member of any group—whether it is the family circle, nursery or school—is too difficult a task to be accomplished by the child alone. Without the control, help and guidance given by the educational efforts of the parents, he is at the mercy of his inner urges and—far from being made happy—becomes anxious, uncertain of himself, and unprepared for life in the adult community in which he will be expected to play a part. While, therefore, an unduly severe and restrictive upbringing may prepare the way for all sorts of neurotic disturbances, excessive freedom for instinct gratification with a lack of educational guidance certainly predisposes the child to social maladjustment.

Parents feel rather despairing at this juncture, as if in their efforts to bring up their children they were faced with the difficult choice between two inevitable evils. Luckily, this is not the case. Further insight into the nature of instinctive urges and discrimination between the instincts in question shows the way out of the apparent dilemma. The child's great body-needs are, indeed, inexorable in their demands. Hunger, when it arises, can perhaps be cheated of satisfaction for a while: the child's attention can be distracted ; thumb-sucking or the intake of water may quiet the clamour of the need temporarily. But, finally, as the tension rises, nothing short of the giving of food will alleviate the child's painful state of dissatisfaction.

Substitute Satisfactions

The same is by no means true of the sexual and aggressive urges of childhood. They are in a high degree pliable and ready to accept substitute satisfactions where the original aim of the instinct is out of reach.

So long as the child is not made afraid of his own desires and not estranged from them through repression, the instinctive energy with which they are invested can be displaced and outlets found which are acceptable to the instinct as well as to the environment. Where, for instance, training for cleanliness is carried out without producing excessive disgust, the young child will easily be induced to turn to the substitute pleasures of smearing and modelling with paint and plasticine instead of handling his own faeces. Children who have not been made too ashamed of their exhibitionistic tendencies are eager to show off their skills and mental accomplishments instead of their bodies, or will turn to acting and dancing as acceptable ways of gaining admiration. Sexual curiosity, if not severely repressed, is especially productive of substitute wishes: it gives rise to a general attitude of wanting to know—about the origin of things (based on curiosity about the birth of babies); about the working of engines and cars (based on curiosity about the functioning of the penis, especially the phenomenon of erection); about big animals (as representatives of the powerful parents) etc.

The aggressive urges, if handled wisely, accept many similar compromises. When displaced onto activities such as cutting, hammering, handling efficient tools, the tendencies to tear open, to break, to hurt can be tempted to serve constructive instead of destructive aims. The wishes for self-assertion and for fighting others may be turned from people to material difficulties and to the overcoming of obstacles, and finally displaced to the fight with the dangers and difficulties of life conditions.

The Gains

It is to this process of displacing sexual and aggressive energy to non-sexual and non-destructive aims that the term sublimation is applied. Viewed from the side of direct and uninhibited gratification of instinct, sublimation means a loss in pleasure. From the standpoint of the environment and the growth of the child's whole personality, sublimation brings great gains: the flow of instinctive energy into socially adapted behaviour widens the scope of the child's interests, transforms otherwise dull and uninteresting tasks into interesting and fascinating pursuits, and—as every teacher can observe—thereby improves the child's ability to work and play and quickens his intelligence.

The instinctive urges which lend themselves best to sublimation are the component instincts of the child's pregenital sexuality (oral, anal, phallic urges), and his aggressive drives. Instinct sublimation takes place in early childhood. It is an involuntary process which cannot be brought about intentionally, and is not accompanied by conscious awareness. The child cannot be forced to sublimate his instincts. He can

merely be offered at the right moments the appropriate opportunities for substitute gratifications where direct fulfilment of instinctive urges is either partially or totally barred.

Sublimation in Adult Life

Sublimation is, thus, more than a mere mode of behaviour which can be adopted at will in adult life when external circumstances, such as absence or other inaccessibility of the sexual partner, imprisonment, illness, etc. make the satisfaction of sexual or aggressive wishes difficult or impossible. It consists of an actual, far-reaching modification of the instinctive processes themselves, so far as their fixation to particular aims is concerned. Where the ability to sublimate has developed in early childhood, the instinctive wishes become less inexorable in their claims, more ready to accept substitute gratifications and therefore more adaptable to the circumstances of life. This makes for less accumulated tension, less feeling of frustration, and creates new and important sources of happiness and satisfaction in life.

Though limited by constitutional differences, the extent to which an individual is capable of sublimation, is dependent on his childhood experiences. No individual should ever be expected to be able to sublimate all his instinctive wishes. Life without any direct gratifications is not compatible with mental health.

The Social Aspect of Sublimation

The process of sublimation is as important for the development of society as for that of the individual himself. The cultural interests of civilised communities depend for their maintenance and progress upon the influx from the sources of deflected instinctive energies.

BIOGRAPHICAL NOTES

ANNA FREUD.—Practising Psycho-Analyst, Member of the British Psycho-Analytical Society, London. Until 1938 Chairman of the Institute of Psycho-Analysis, Vienna, Austria. 1940-1945 Organiser of a residential war nursery for homeless children ("Hampstead Nurseries"). Author of several publications concerning the theory and practice of psycho-analysis and its application to the treatment and upbringing of children.

A. B. APPLETON, M.A., M.D.(Cantab.), M.R.C.S., L.R.C.P.—Professor of Anatomy in the University of London at St. Thomas's Hospital. Hunterian Professor Royal College of Surgeons. Professor of Anatomy in the Royal Academy of Arts. Former Fellow of Downing College, Cambridge. President of the Anatomical Society of Great Britain and Ireland. Member of the Physiological Society. Author of Papers on "Posture", "Physical Education", and on the skeletal, nervous and muscular systems etc. in the "Journal of Anatomy", "Lancet", the "British Medical Journal", the "Practitioner" "Journal of Physical Education" etc.

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HEREDITY AND ENVIRONMENT —PART I HEREDITY

By M. H. Clifford, M.A., Ph.D., B.Sc., *Extra Mural Lecturer in Natural Science, University of Cambridge.*

In this brief review it is proposed to give some account of the biology of human development as it is affected by factors of heredity and of environment, in the hope that this may assist a practical approach to many human problems, both personal and social.

What is Heredity?

For the biologist, heredity is quite apart from considerations of family tradition, opportunities due to home circumstances, and so on. It is the manner and the mechanism whereby individual characteristics pass down the generations through the periodic union of egg and sperm at the commencement of each new life. It matters little whether the subject of study be mouse, or chick or man. Similar principles are involved in each case and these are investigated in the science of genetics.

Reference to the accompanying text figure will show that for black and white coat colour in mice, black is the colour which is *shown* by hybrid animals. It is thus said to be dominant to white. But, as was first shown by Mendel (c. 1866) for peas, the opposite characteristic (here white coat) is merely recessive to the black and has not been ' lost '. Thus two *hybrid* black mice on mating produce a proportion of white mice in the next generation. When large enough numbers are considered, the proportion of white mice out of the total is constant and amounts to 25 per cent. These white mice are found to be pure breeding. Since they *are* white they can possess no dominant factor for black coat and thus they can only transmit factors for white coat. On mating, therefore, two such mice produce all white progeny. Likewise a proportion (again 25 per cent of the total) among the black progeny of the hybrid parents are found to be pure breeding. The remainder on test prove to be hybrid, since, when mated together, they behave like their parents. These results are statistical in character. That is to say they can confidently be expected as ratios, where large numbers are involved, but the characteristics of the *next* animal to be born can never be told in advance.

In the case of matings involving other contrasting characteristics different numerical ratios may sometimes be obtained, but on a similar repetitive basis. Analysis of such results has established the concept of genes as physical units, transmitted through eggs and sperm alike, influencing in development the characteristics of the animal begotten by any

particular fusion at fertilisation. Two genes, one from each parent, are held to be necessary for the production of a given characteristic. If it is also assumed that when eggs or sperms are later formed by the individual these genes must go into different eggs or sperms to unite on a random basis at the subsequent fertilisation, then the observed ratios are to be expected on theoretical grounds. The course of events for coat colour inheritance in mice is portrayed in the text figure by means of symbols representing the types of egg and sperm to be expected from the various animals involved. Since the inception of this theory, much circumstantial evidence has been obtained that it corresponds closely to the course of events during reproduction.

Inheritance in Man

In man the condition of short fingers (brachydactyly) behaves similarly to black coat in the mouse. It is thus regarded as a **dominant** type of defect. (Except that it is possible that the double dose of the defective gene is exhibited by an absence of hands and feet—known as adactyly. If that is true, then the brachydactylous state is the **interaction** effect of the contrasting genes for the normal and adactylous states). In these types of inheritance an affected person transmits to a proportion of his or her children on a basis of probability that can be calculated where the hereditary condition of *both* parents is known. Children that escape the defect will not normally have affected children provided their spouses are likewise unaffected. Typically these defects can be traced back continuously through the generations, always by way of affected persons. Such a distribution corresponds to what is popularly considered to be hereditary transmission.

But the inheritable defective gene may be **recessive** in action, as with white coat in mice. Then only persons with *both* genes defective for the particular characteristic can exhibit the defect. Many persons *appearing* normal may be carriers of the recessive gene (e.g. hybrid black mice as carriers of white coat factor). Two such apparently normal parents marrying are likely to produce a proportion of defective offspring where the family size is large enough or where similar families are considered together statistically. Defects of this kind may thus appear to ' skip ' one or more generations, and may be commoner among brothers and sisters of the same marriage, than between parents and children. Such familial characteristics have not always been considered hereditary in nature, but genetical research indicates that they are so nevertheless. In man, the albino state is an example of this, as are probably some forms of feeblemindedness. Where two affected persons marry all the progeny are likely to be affected since, to be affected themselves, both parents must lack genes for the normal condition.

Blood Groups and Pigmentation

Recent studies have shown that other instances of the non-lineal distribution of characteristics can be explained in terms of genetical principles if certain simple assumptions are made. For plants and animals it has been possible to demonstrate the validity of some of these suppositions by experimental matings. In the case of man the statistical analysis of family pedigrees has been used as a check in place of experiment. Thus in man it is probable that three genes, *alternative* to one another, are involved in the determination of the four major blood groups. Of these only two can be possessed by any one individual. It therefore happens that the mating of persons of A and B groups respectively has a somewhat wider range of possible outcome than might have been expected, and may produce some group O children according to the genetical status of the parents. In the case of the pigmentation differences between negroes and whites it is likely that several *pairs* of genes are involved on an additive basis. Thus hybrids of the first generation are mulattos of intermediate tone. If such mulattos mate together a wide range of skin colours *may* appear among the progeny, from extreme white to extreme black, but with mulatto pigmentation occurring more frequently than the other shades. The relative frequency of the extreme types is thought to express the number of gene *pairs* involved.

We may thus conclude that many characteristics in man not transmissible in any simple lineal fashion are nevertheless hereditary in character, such conditions being the expression of the presence or absence of genes derivable from the parents.

Explanation of text figure (opposite)

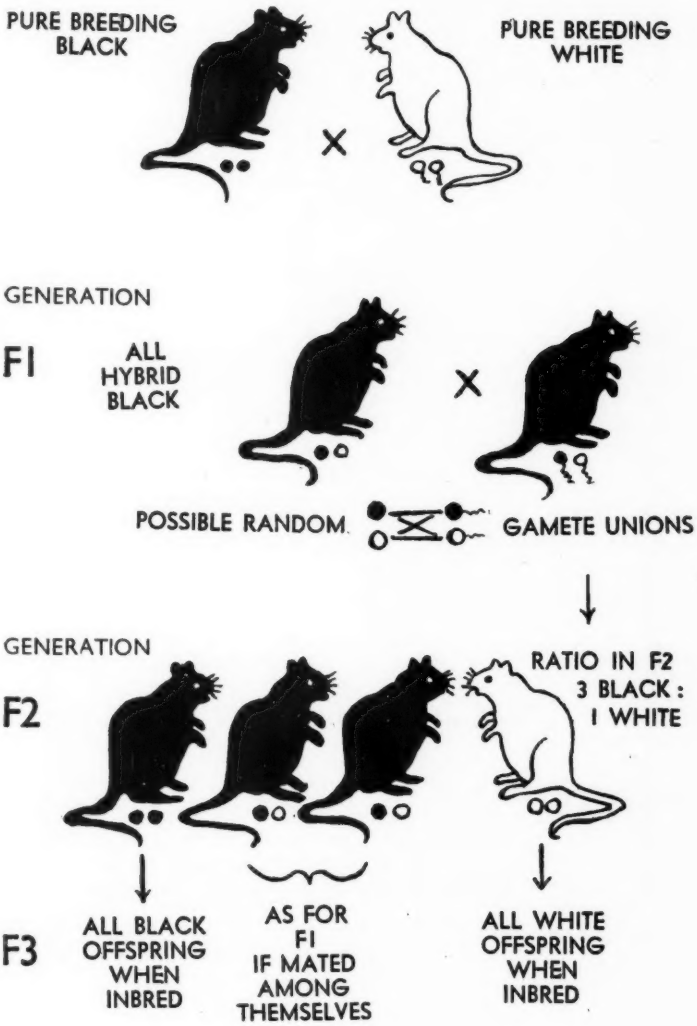
The gametes (i.e. eggs and sperms) are represented by the symbols ○ ● and ♂ ♂ respectively. Black symbols indicate gametes bearing a dominant gene for the development of black coat, and white symbols gametes bearing the recessive gene. By definition, gametes bear only one out of the relevant pair of genes possessed by the parents.

Animals purebred for the characteristics in question produce gametes *all* of which bear either dominant or recessive genes according to the characteristic exhibited by the individual. Hybrid mice are held to produce both gametes bearing the dominant gene *and* gametes bearing the recessive gene. These they produce in the ratio 1 : 1 as the result of a process known as segregation which occurs during gamete formation.

When two hybrids mate the *random* mating of the eggs produced in the 1 : 1 ratio with sperms also produced in a 1 : 1 ratio will take place as shown in the small diagram. The result for a large number of unions should be progeny in the ratio 1 (double) black: 2 hybrids (black): 1 (double) white. (It is not significant that only females are shown in the F2 generation. There is no association in this case of coat colour with sex).

A second article by Dr. Clifford will appear in our next issue.

COAT COLOUR IN MICE



What about you?

PLEASE DO NOT SPIT

Hlth. Educ. J., 1948, 6, 33—37

FOOD HYGIENE—A JOINT APPROACH

By Francis Arthur Belam, T.D., M.D., D.P.H., *Medical Officer of Health, Guildford.*

A considerable amount of illness—some of it fatal—is caused by infection of food and drink. Yet, of all ailments, food and drink infections are the most open to control by measures of public and individual hygiene.

The Problem

Because certain food premises were found to be unsatisfactory, it was decided to carry out a comprehensive survey of all food premises in the Borough of Guildford during November 1946. It was suspected that conditions had worsened during the war. Staff was difficult to get, and was constantly changing: inevitably, therefore, many of the workers in food premises were poorly trained and inexperienced. Moreover, no alterations or decorations could be carried out to premises during the war years. All these things together made it likely that food premises and their equipment might be unsatisfactory, and that a proper standard of food hygiene might well be lacking.

The survey included 317 food premises and was carried out by the staff of sanitary inspectors under the guidance of the chief sanitary inspector. This involved investigation of the hygiene of manufacture, handling and distribution. The sanitary condition of the premises was also ascertained.

The premises inspected included 12 premises used for the manufacture and sale of ice cream ; 8 dairies (two of which had large pasteurising plants) ; 25 bakehouses ; 48 cafes and restaurants ; 156 grocers, confectioners, greengrocers and general stores ; 52 butchers, fishmongers, fish fryers and cooked meat premises ; and 3 slaughterhouses (which were found to be most unsatisfactory, because of badly situated buildings, and inadequate lairage, slaughtering and hanging accommodation).

The undesirable findings were: faulty structure of premises, inadequate provision for washing, inadequate and unsatisfactory hot water supply, insufficient convenience provision with adjacent wash-hand basins, lack of provision of clean towels with soap and nail brushes, insufficiently high standards of personal cleanliness, and unhygienic practices of staff.

There are, of course, legislative powers that could be used to tackle the problem. But it was felt that it would be much better to try to gain the willing co-operation of the managements and the actual food handlers. The campaign for a higher level of food hygiene would then become a

joint effort of the local authority and the owners, managers, and rank and file of the food handling industry.

The First Step

The health committee therefore called a conference to which representatives of the chamber of commerce and the food traders organisations were invited. These organisations were twelve in number, and appeared to represent most of the interests involved. Unfortunately it was found that several of the associations named were either non-existent or inactive, and that not all of the food traders belonged to or had organisations.

At this conference the problem was reviewed and the need for co-operation stressed. It was suggested that a Guildford Hygienic Food Traders Guild should be established, with the aim of voluntarily raising the whole standard of food hygiene within the borough, and that, following discussion between the local authority and the various food handling trades and organisations, there should be drawn up codes of practice that would be voluntarily adopted by all those who joined the guild. Membership signs for display in the premises and membership badges to be worn by the employees would be issued to members of the guild and withdrawn when a firm failed to conform to the codes of practice.

The immediate response was cautious. Certain traders were suspicious that there might be a catch somewhere. Because of the possibility of traders having the signs withdrawn from their premises if they failed to comply with the necessary standards, the suggestion that signs and badges should be issued was the main cause of dissension. They recognised that, once the public came to realise what these badges meant, their withdrawal would have an adverse effect on trade ; and they considered that the system of badges and signs would cause ill feeling between traders since some of the small traders might be unable to comply with the requirements. Those attending were broadly sympathetic to the proposals, however, and decided that they would like to think them over, to discuss them with their colleagues and organisations and to take part in further discussions. It was therefore agreed that there should be other exploratory meetings of a more representative nature.

Further meetings were then held at which agreement was gradually reached, and it was ultimately decided that a guild of the type proposed should be established and that codes of practice should be drawn up for the various trades. At these meetings, too, rough outlines of the codes of practice took shape.

These codes of practice were detailed hygienic requirements specifically related to each type of food trade, and practically all were requirements enforceable in law, under Section 10 of the Shop Act 1934, and Sections 13 and 14 of the Sale of Food and Drugs Act 1938.

The Scheme Crystallises

The next step taken to gain the support of the traders and the interest of the public in the scheme was the staging of a food hygiene exhibition, which was held in January 1947, and was a very great success, being attended by about seven thousand people. It was opened by Mr. Mallelieu, M.P., and demonstrations were given by officials of the Ministry of Food, food films were shown and talks were given. The Army School of Hygiene and many other associations took part. It was seen by many school children.

This exhibition really put the guild on its feet, and a representative of every food trade was invited to a meeting held the following month. Those who did not belong to organisations were thus included.

Again certain food traders played for time and desired further consultation with their organisations: the stumbling block was still the badge question. At this meeting, however, it was agreed that an organisation to be known as the Guildford Hygienic Food Traders Guild should be set up with the objects of (a) improving the sanitary conditions and arrangements in food handling premises ; (b) ensuring that the statutory standards of food hygiene were observed ; (c) establishing codes of practice for different trades which would be voluntarily accepted and applied by member firms of the food traders guild. An advisory committee was appointed from the meeting with the two-fold function of assisting the local authority in the detailed formulation of the codes or practice and of supervising the scheme in co-operation with representatives from the health committee. The advisory committee consisted of 12 representatives of fifteen trades, one of the Union of Shop Distributive and Allied Workers, five of the local authority.

On the 9th May the first meeting of the advisory committee was held. The Mayor presided and gave the Council's blessing to the scheme. At this meeting it was agreed that the question of badges and signs should be left for discussion later. Sub-committees were appointed to examine in detail the codes of practice for different trades and to amend them where necessary. Publicity and education sub-committees were also set up to arrange publicity for the scheme including talks to employees, schools and women's organisations and employers.

It was decided that the scheme should be brought into force by the early part of 1948, by which time it was anticipated that the traders would have had time to get their premises into order.

Codes of Practice set up

At further meetings of the sub-committee the codes of practice were thoroughly and minutely examined by the representatives of the trades concerned. These codes of practice covered the following trades: ice

cream manufacturing and distribution, cafes and restaurants, cooked-food premises, grocers and general stores, butchers, bakehouses and confectioners, fishmongers and fish fryers, greengrocers and fruiterers, dairies, sweet shops. It was found most useful to have the expert knowledge of the member of the trade in question to keep the balance between what the local authority considered desirable and what was in fact practicable. This meant that only standards which could be complied with even in these difficult times were allowed to stand.

In the course of these discussions the traders did not hesitate to insist on the protection of open displays of foodstuffs in the Guildford market: in consequence representation was made to the Market Committee of the Council to see what could be done to improve conditions. Naturally the food traders and shopkeepers did not see why they should make provision which was not demanded from traders in the open street.

It was found that the codes of practice for ice cream handling could not altogether cover ice cream sold at fairs, fêtes, etc. It was therefore decided that it was desirable that such places should be supplied only with cartons of ice cream pre-packed in individual portions.

Another interesting feature arose when it was discovered that dog food was being manufactured in a cooked meat factory. Since there appeared to be no existing legislation to prevent this, it was decided that the appropriate codes of practice should be amended to prohibit the preparation or manufacture on the food premises of foods other than those intended for human consumption.

The value of the advisory committee was again made apparent at a meeting held in September when it was alleged by representatives of the food traders that there was an unequal distribution in the supply of crockery and cutlery, which were almost unobtainable in Guildford, but plentiful in the coastal towns. Successful representations were made to the Board of Trade.

The Ministry of Food was also approached regarding the unsatisfactory method of supply of meat to the retail trade—the handling by drivers, porters, etc. being definitely unsatisfactory.

The Guild is Formed

At a meeting of interested groups on the 3rd November, 1947 the complete scheme for the establishment of a Hygienic Food Traders Guild was submitted and codes of practice were circulated in printed form. At this meeting, the advisory committee was authorised to carry on with the scheme. It was agreed, however, that it should not come into operation until the 1st March 1948 so that there should be time for the necessary alterations and improvements to premises. But in the meantime, the codes of practice have been circulated and special instructional pamphlets

for employees have been printed and distributed. It must be emphasised, however, that no trader will be permitted to make unnecessary improvements to his premises solely for the purpose of extending his business. Alterations will be kept to a strict minimum ; stress being laid upon compliance with the standards laid down.

Any food retailer may now apply to join the Guild. The application will be considered by the advisory committee and membership will be granted if the conditions and the practices comply with the code of practice applicable to the trade concerned. The premises of the member firms will be regularly visited by the Sanitary Inspectors and members infringing statutory or other obligations will be expelled or temporarily excluded from membership.

It is realised of course that the success of the scheme will depend upon the support and co-operation of the housewife. Continuous attempts will therefore be made to educate the general public to demand a high standard of cleanliness in the shops at which they trade and to develop an equally high standard in their own practice at home.

This Guildford plan is still in its early experimental stages and its worth has not yet been proved. But already there has been a great change in the attitude of almost the whole food handling industry in Guildford to their duties and responsibilities ; and already a considerable improvement has taken place in their premises and practice. A scheme of this type, based upon education and voluntary participation will necessarily take time to produce results. But the improvements that have taken place raise the hope that in such schemes of voluntary co-operation and joint effort may lie the real solution to the problem of food and drink infections.

A Report containing in full the papers read at the Conference on Food and Drink Infections held recently by the Central Council for Health Education will be ready early in February.

The Report will also contain a comprehensive bibliography, lists of the available health education material on food and drink hygiene and notes on the present legal powers. Orders should be placed now. Price 2s. 6d.

BIOGRAPHICAL NOTE

FRANCIS ARTHUR BELAM, T.D., M.D., Ch.B., D.P.H., F.R.S.I. Lieut.-Colonel R.A.M.C., T.A.—Served R.A.M.C. 1914–19 and 1939–45. Public Health posts, Liverpool, Chester and West Riding Yorks, since 1927 M.O.H. Guildford. Author of articles on Public Health Subjects.

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IMMUNISATION

By Robert Cruickshank, M.D., F.R.C.P., D.P.H., *Director, Central Public Health Laboratory, Colindale.*

Cure of disease has a more dramatic appeal than prevention. But medicine, unlike war, often finds defence the better form of attack, and preventive medicine is playing an increasingly important part in the fight against disease, particularly in the field of infectious disease. The transmission of infection requires at least three component parts—a reservoir, which may be man or animal, where the infecting germ lives and multiplies ; a susceptible person, and a means for transfer of the infecting agent from reservoir to new host. If we take typhoid fever as an example, the reservoir is often the gall-bladder of a patient who has had the disease ; here the typhoid bacillus lives and multiplies and passes into the bowel from which it escapes in the excreta ; the means of spread may be a water supply polluted with human excreta, and the victim is any susceptible individual who drinks the polluted water. Now obviously preventive medicine could attempt to break this chain at any one of its three main links ; (1) by seeking out the carrier of typhoid bacilli and perhaps removing his gall-bladder, or at least preventing him from polluting water or food supplies ; (2) by purifying the water supply ; or (3) by attempting to make the susceptible person resistant to attack by the typhoid bacillus.

The second of these measures was the first to be put into practice in most countries, with remarkable results. For instance, in Britain over 350 deaths per million of population occurred annually from typhoid fever some seventy years ago ; today with a purified water supply and the proper disposal of sewage, only 5–6 per million die of the disease. When, however, a high standard of sanitation cannot be maintained, as for example among armies in the field, it then becomes important to try to raise the resistance of the susceptible population. In wars before the first World War typhoid fever was one of the great causes of sickness and death. Then, just half a century ago, Sir Almroth Wright inoculated two volunteers of the Indian Medical Service with killed typhoid bacilli and proved that this procedure gave protection by injecting living organisms into one of the men without producing typhoid fever.

Active and Passive Immunisation

Artificial protection of this kind against infectious diseases is usually called immunisation, and may take one of two forms. We may prepare killed suspensions of the microbe that causes the disease, and give injections of this vaccine, as it is called, into the susceptible individuals. The vaccine stimulates the host's tissues to produce antibodies or substances

which act against that particular germ. If later the vaccinated person inhales or swallows some of the living germs he is resistant to their poisonous effects in the same way as is the man who has had an attack of the disease. Indeed, it was the observations that milkmaids who had suffered from cowpox were resistant to smallpox, and that cattle that survived an attack of anthrax were immune to further attack, that gave Jenner and Pasteur their ideas of protecting men and beasts by artificial immunisation.

Now it is possible by repeated injections of killed bacteria or material derived from them to produce in the blood of horses or other animals a high level of antibodies, and these antibodies, concentrated in horse serum are used to treat human sufferers, as is the case with the antitoxin treatment of diphtheria. The same antiserum can also be used to protect those in close contact with a case of infectious disease ; for example by giving small doses of antitoxin to other children in a family where one member has developed diphtheria. This procedure is called passive immunisation because antibodies are supplied ready-made, in contrast to the active immunisation produced by vaccination when the inoculated person produces his own antibodies. Passive immunisation gives immediate protection which, however, lasts for a few weeks only, whereas active immunisation does not give maximum protection until some weeks after the injections, but the immunity lasts much longer, usually for 2–3 years and in a few instances for life.

In some diseases, such as typhoid fever, cholera and plague, the damage is done by the germ itself, in others by a powerful poison or toxin which the germ secretes as in diphtheria and tetanus, while in a third group, e.g., smallpox and influenza, infection is caused by ultra-microscopic germs called viruses which cannot grow apart from living cells. In this last group we include the rickettsias which cause various forms of typhus. To illustrate some of the advances that have been made in immunisation during recent years, I shall take examples from each of these three groups. Incidentally, it is rather sad to think that war is often the stimulus to medical advances, but it bears out the old proverb that " necessity is the mother of invention ".

Bacillus and Toxin

Let us consider first typhoid fever. Although vaccination against typhoid and paratyphoid was used successfully in the 1914–1918 war, it was only in the years before the last war that we appreciated what is needed in the typhoid bacillus for the preparation of an effective vaccine. When pathogenic bacteria are grown under artificial conditions outside the body, they lose some of the substances which are necessary for them to produce disease in their host. Now, researches have shown that the capacity to

produce disease depends in the typhoid baccillus on two important fractions of the organism, which have been labelled the 'O' and 'Vi' substances. Tests in mice and in the test-tube tell us whether or not these fractions are present, and today in the preparation of typhoid vaccine we use only germs that are rich in these aggressive substances. Two injections of this new typhoid vaccine, given at a few weeks' interval, will give a high degree of protection against typhoid fever. The superiority of a British vaccine over that made in some other countries was demonstrated in North Africa in 1943 when Italian prisoners of war inoculated with an Italian vaccine were not protected against an outbreak of typhoid, which however was brought to an abrupt end when the same troops were given injections of the British vaccine.

Among the diseases where damage is done by powerful poisons or toxins which the organism secretes, we select tetanus or lock-jaw as another infection against which modern medicine has produced a successful antidote. In the 1914–1918 war tetanus antitoxin, produced in the horse, was used on a large scale to protect wounded men against this horrible disease. However, the antitoxin gave only passive and therefore temporary immunity so that wounded men often required several injections at weekly intervals while others received their injections too late. Just before the last war therefore, trials were made in active immunisation against tetanus with tetanus toxoid, that is, toxin which has been rendered non-poisonous by the addition of formalin. Two injections of this toxoid, given at six weeks' interval, produced enough antibody to protect men against tetanus, and this method was adopted throughout the British Army and Air Force, supplemented by an injection of tetanus antitoxin when a man was wounded. Analysis of the results in the British Army has revealed an incidence of only four cases of tetanus per 100,000 wounded men in the campaign in Western Europe, compared with a figure of 147 per 100,000 during the 1914–1918 war.

Tetanus is still prevalent in many parts of the world, and is particularly likely to affect newborn babies and mothers after childbirth. If expectant mothers were immunised with tetanus toxoid during the latter months of pregnancy, not only they themselves, but also their babies, would be protected against tetanus since antibodies are transferred from mother to unborn infant, and these antibodies will protect the baby for some months after birth.

Another common disease in which immunisation with toxoid has been highly successful is diphtheria, and since 1940, when the Chief Medical Officer of the Ministry of Health inaugurated a nation-wide campaign against diphtheria, the number of cases of diphtheria has been reduced to less than one half, while deaths are only one quarter of those annually recorded before the war.

Virus Infections

Since the germs of the virus and rickettsial infections cannot grow without the presence of living cells, a diet quite different from that which suits the larger bacteria had to be devised for their growth outside the body. At first we used minced mouse or rat embryo mixed with serum as the culture medium, or we infected small laboratory animals and used their ground-up tissues. But now we obtain large yields of viruses and rickettsias by growing them in or on the developing chick embryo. This discovery was a tremendous boon to those who were concerned with the protection of our troops against louse- and flea-borne typhus which were endemic infections along the shores of the Mediterranean. Large supplies of rickettsial vaccines were prepared in the United States of America and Canada so that latterly all troops going on foreign service could be inoculated against typhus. The results were dramatic. Despite frequent and close exposure to the risk of infection, there was only a handful of cases of typhus among our troops in North Africa and in Italy where there were epidemic outbreaks of the disease.

Protection against smallpox was practised in ancient China long before it was adopted by Western civilisations. Nowadays, however, instead of using material from actual cases of infection we prepare a modified lymph vaccine in calves or sheep, store it in glycerin to destroy contaminating bacteria, and use this live vaccine to produce a local skin infection, called vaccinia, which gives protection against smallpox. Although outbreaks are rare in Great Britain smallpox is still prevalent in many parts of the world and it is to be hoped that immunisation campaigns such as have been carried out in certain areas with excellent results will be widely extended so that this dread disease can be stamped out.

Indeed, the continuing annual death roll from smallpox is a striking example of man's failure to apply his existing knowledge for his own protection and well-being. There are many diseases which can now be controlled, if only we will apply our existing knowledge and resources. The reasons for our failure to do so are complex, but ignorance and prejudice are undoubtedly important factors. Here then is an interesting and profitable field for health education.

BIOGRAPHICAL NOTE

JOHN F. WARIN, M.D., D.P.H.—Deputy Medical Officer of Health, City of Leeds and Lecturer in Public Health, University of Leeds. Joint Honorary Secretary, Leeds Committee for Social Hygiene and Health Publicity. Formerly Assistant Medical Officer of Health, City of Birmingham and Assistant Medical Officer of Health, County Borough of Blackburn. Author of numerous articles on various aspects of Public Health work published in the Medical Journals.

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THE TRUE SIGNIFICANCE OF REHABILITATION

By Harold Balme, O.B.E., M.D., F.R.C.S., D.P.H., *Medical Officer in Charge of Rehabilitation, Ministry of Health.*

Medical science is often accused of having a very conservative outlook, particularly in matters of treatment, and there is probably some truth in the charge. The Hippocratic tradition runs deep amongst members of the medical profession, and there is a tendency to wait for experimental proof before embarking on new lines of action. And yet, looking back over the years, it is interesting to see how the whole conception of treatment has grown and expanded, as new branches of science have opened up new possibilities of preventing or curing disease and disability. The first great advance was the emergence from mere empiricism into the field of rational treatment, based upon careful clinical investigation, the observation and correlation of symptoms, and the background of accurate anatomical and physiological knowledge. Next came the study of pathology and bacteriology, with their invaluable contribution to our knowledge of the processes of disease, and the possibility of preventing as well as curing physical disorders. The application of psychology to medicine marked the next milestone along the road to true understanding of human ills and the interplay of mind and body in relation to disease. And now, in these last two decades, we are watching the development of what is generally known as social medicine, which is an attempt to study problems of health and disease in relation to social environment.

Rehabilitation and Social Medicine

The increasing attention which has been given to the rehabilitation of the disabled during the past few years really falls within the category of social medicine, though this fact is not generally recognised owing to the circumstances in which such provision came into force. It was the need for man-power during the war years, and the vital importance of getting sick and injured troops and essential war workers back to duty with the minimum of delay, which gave the stimulus to measures for rehabilitation. At the same time, men who were unemployed through disability were carefully considered from the point of view of fitting them for some form of productive employment; of 200,000 disabled people who were out of work at the beginning of the war, no less than 180,000 were found employment. This fact, coupled with the legislation which succeeded in the form of the Disabled Persons (Employment) Act,

has directed attention to the end of rehabilitation—namely resettlement in a suitable occupation—rather than to the means to that end, and the whole process of rehabilitation has come to be regarded in many quarters as consisting of a purely industrial problem. This, however, is putting the cart before the horse. Rehabilitation is essentially a medical problem and is, in fact, part of the attempt at readjustment to social environment which forms the basis of social medicine. It is not merely as a potential wage-earner, or as one more addition to industrial output, that the rehabilitation of the disabled man assumes importance. Its prime importance lies in the fact that no form of medical or surgical treatment is complete if it stops short of refitting the patient for that position in the community in which he can play his best part and derive his greatest satisfaction.

It may thus be claimed that the real significance of the steps now being taken to organise a system of full rehabilitation as an integral part of the national health service lies in a truer appreciation of medical responsibility. It is not enough to diagnose the cause of disease or disability and apply appropriate treatment to the particular part of the patient's body which happens to be affected. The patient must be treated as a person and studied in relation to his environment ; and the prejudicial effect which his illness or injury may have upon his ability to fit into that environment must be counteracted by the fullest possible use of the various methods by which he can be helped to regain his functional capacity. Thus physical medicine, remedial exercises and games, occupational therapy, social service and vocational guidance are all called upon to make their individual contributions to this common task of rehabilitation. In other words, the patient must not only be studied as a whole but he must be seen right through.

The Principles Involved

In carrying out this process of rehabilitation, there are certain governing principles which need to be carefully observed, if full success is to be obtained.

In the first place, it is essential that the work of rehabilitation must start from the very onset of any disabling illness or injury, and must not be content to wait until disablement has actually occurred. As has frequently been remarked, rehabilitation commences in the ambulance, and the most perfect results are always to be found in cases where appropriate measures have been commenced at the earliest possible moment after an accident or the commencement of serious illness. It is as important to prevent or limit disablement by early measures of rehabilitation, as to prevent ill health or deformity by early physical education and training.

Secondly, rehabilitation must always be regarded as a continuous process, which does not cease until the fullest possible recovery of physical and nervous capacity has been attained and the patient is able to resume his former life, or to occupy that place in the community in which his disablement will prove the least possible handicap. One of the most serious defects in our present system is the long and dangerous gaps which occur on this road to recovery. There is only too often a long interval between the application of specific medical or surgical treatment and the commencement of physical rehabilitation. There is another long and dangerous gap between the termination of such rehabilitation and the fitting of the disabled man for appropriate employment. Most serious of all is the gap which only too often appears between the time spent in training for new occupation and actual resettlement in industry. It is during these periods of waiting that chronic invalidism or even neurosis is apt to settle upon the patient's mind, and he becomes obsessed with his disability instead of concentrating his thought upon what he can successfully accomplish in spite of any residual disablement.

Thirdly, the scheme of rehabilitation adopted by any hospital or rehabilitation centre must be in the nature of a corporate act, in which the doctor who is directing the patient's course of treatment and the various auxiliary members of the rehabilitation staff who are assisting him in this task, all work together as a team. Rehabilitation must never be looked upon as the cumulative effect of a number of separate activities. It is essentially a unified process, modified to meet the needs of each individual patient, progressing in character in relation to each advance on the road to recovery, and harmonised to suit the idiosyncrasies of temperament and circumstance which play so large a part in the patient's own reaction towards his disability.

Fourthly, the prime emphasis of rehabilitation must be directed towards residual ability instead of residual disability. It is here that we come face to face with what is perhaps the most important contribution which rehabilitation, rightly conducted, can offer. Any form of serious illness or injury appears to the patient as something which is going to deprive him of some faculty which he prized and it is only natural, therefore, that he thinks of it in terms of loss. He is facing a future in which he will no longer be able to live the same life that he did before, and he is inclined to magnify the disabling effects of his disorder. It is just in so far as we are able to direct his mind to the full and satisfying life which he will be able to live, in spite of his disability, that we attain the highest degree of rehabilitation in his individual case, and offset the depressing effect of his misfortune.

Lastly, the whole work of rehabilitation must be related to the actual occupation of the patient, and directed towards refitting him for the

particular work in which he will be engaged. It is useless to provide a common programme of remedial exercises and occupational handicrafts for miners and for light precision workers ; the former need strength of muscle and limb, the latter flexibility and dexterity of hands and fingers. And each should be prepared accordingly—wherever possible in industry itself. One of the most interesting experiments in this direction has been carried out at Luton, by the co-operation of the rehabilitation department at Vauxhall Motors and the surgical staff of the Luton and Dunstable Hospital. Every case of injury occurring in that large industry receives medical attention at the works and the patient is placed at the earliest possible moment on the type of job which is best suited to his temporary disability, his stay in hospital (if the injury is sufficiently serious to demand surgical operation and in-patient treatment) being reduced to a minimum, and the terminal stages of his rehabilitation being carried out whilst he is actually engaged on productive work and again earning a wage.

A Responsibility to Others

If we are to become more physically fit as a nation, as is the aim of all interested in health education, the full and scientific rehabilitation of the potentially unfit or disabled must take a high place in our planning. It is needed for the sake of the nation's economic recovery. It is needed as a means of relief from the financial burden of maintaining in idleness those who might be refitted for useful employment. But it is needed, most of all, as a measure of our responsibility towards those who have the misfortune to fall out of the race through illness or injury, but who, with proper care and treatment, can be set on their feet and helped to run again.

BIOGRAPHICAL NOTES

HAROLD BALME, O.B.E., M.D.(Durham), F.R.C.S.(Eng.), D.P.H.—Medical Officer in Charge of Rehabilitation, Ministry of Health, since 1943, and Director of Welfare Services, British Red Cross Society. Formerly, Principal of Cheeloo University, North China. Medical Superintendent of 2 E.M.S. Hospitals during the early part of the war. Author "The Relief of Pain", "China and Modern Medicine", and "A Criticism of Nursing Education".

MONTAGU H. CLIFFORD, M.A., Ph.D., B.Sc.—Extra Mural Lecturer in Natural Science, University of Cambridge. For ten years engaged in bringing the methods and the results of scientific research to the attention of the ordinary citizen. Author of recent articles in "Discovery", "Adult Education" and "Nature", dealing with the problems involved in such work. A biologist interested in the application of scientific method to medicine and to the problems of human relationships. Original research work in connection with human prehistory.

FILMS

PLAYING WITH FIRE (1947). 35 mm. Sound. C.O.I. for Ministry of Health. 10 minutes.

Six hundred children are killed and twelve thousand injured every year as a result of injuries from burns and scalds sustained through carelessness in the home.

This film is intended to show parents how these accidents occur and what precautions should be taken to guard against them.

Common forms of accidents in the home are presented in dramatic form, while other scenes show injured children under treatment in hospital.

The film is not suitable for showing to children.

CHILDREN LEARNING BY EXPERIENCE (1947). 35 mm. Sound. C.O.I. for Ministry of Education. 35 minutes.

This is a study of children as they go about absorbed in their own affairs, learning in their own way. The film is designed primarily for teachers in training. It provides material for study and discussion and is to be used in addition to first-hand observation of children. It can be used as a whole, but is arranged so that sections may be projected separately for detailed study. A technique in which the commentary is brief and shots are allowed to run much longer than is usual was adopted, in order to give time to consider the significance of the children's actions. The film raises a number of problems and asks questions to which simple and unanimous answers cannot be given, but which will stimulate not only teachers, but all concerned with children, to fresh thinking.

Little has been staged and most of the material was obtained when the children either did not know, or had forgotten, that the camera was there. So we see children as they really are ; curious, imaginative, tiresome—but, to most people, attractive. The film, therefore has a general appeal to all who are interested in children.

CHILDREN GROWING UP WITH OTHER PEOPLE (1947). 35 mm. Sound. C.O.I. for Ministry of Education. 30 minutes.

This is the story of children's development towards that balance between individualism and co-operativeness which is the achievement of the truly mature adult. The film is designed for teachers in training, to help them to see the problems of the particular age group with which they are to be concerned, in relation to a continuous process of development. Techniques similar to those used in " Children Learning by Experience " have been adopted. Thus shots are allowed to run longer than is usual, and although the film may be used as a whole, it is arranged so that it may be projected in sections and provide material for detailed discussion.

The film deals with children and their parents and friends. It is not a film about school, or of interest only to the professional educationist. We see children happy and active, and we see them angry and frustrated, but all the time reacting vigorously to the situations they meet. Two parallel threads run throughout. There is the child's emergence, from the involuntary dependence and self-absorption of the earliest days, to the self-reliance and widening range of interests. At the same time, there is the development of his awareness of other people and an increasingly conscious restriction of his own aggressive individualism as he grows up. The pattern of this development is the pattern of the film. In the final sequence a group of adolescents, in an unrehearsed discussion, are feeling their way towards some of these ideas.

REVIEWS

PSYCHOLOGY OF WOMEN, Vol. I—GIRLHOOD, by Helene Deutsch, M.D. (Research Books Ltd. 1946. Pp. 304. Price 21s.)

Dr. Helene Deutsch has given us here a study of the psychology of girlhood from prepuberty to adult life. Dr. Deutsch's standpoint is that of a Freudian psycho-analyst and her conclusions are supported by a wealth of case history material drawn from both her own records and those of other workers. The book is particularly interesting for the light that it throws on the problems of delinquency in adolescent girls.

In spite, however, of the statement quoted on the dust-jacket, this is hardly a book likely to "be read with understanding and profit by mothers and young women who hope to be mothers". It is essentially a contribution to technical Freudian literature and as such is rather designed for those who have some knowledge and understanding of the basic concepts of psycho-analysis.

K. M. CATLIN.

BIOLOGISTS IN SEARCH OF MATERIAL. An interim report on the work of the Pioneer Health Centre, Peckham, by G. Scott Williamson and I. H. Pearse. (Faber & Faber. Revised 1947. Pp. 107. Illus. Price 5s.)

Most people interested in the development of sensible health services and appreciative of the need for community effort know of the pioneer work in Peckham. Many of us look upon it as a pattern for future development on a country-wide basis. This monograph, published presumably with a view to interesting a larger public and attracting financial support, gives a brief description of the aims and procedures of the Health Centre to which no one can take exception. Details are then given of the method of examination of the material —this being of course, the members of the community, and in the final chapter the results of examination of the material are dealt with. An effort is here made to divide individuals into three categories "Disease," "Well-being" and "Health" and an attempt made to define "well-being" which would appear to be a dangerous state, judging by the many disorders, e.g., piles, flat foot, shortness of breath and bronchiectasis from which those included in this group can and do suffer. The Peckham Health Centre has done a fine pioneer job and will do even better in itself and as a prototype of others. The authors would be well advised to couch future publications in simple straightforward language and to avoid the pseudo-scientific and vague semi-philosophical platitudinising which permeate this one.

ANDREW TOPPING.

OLD PEOPLE'S WELFARE, by The Old People's Welfare Committee. (National Council of Social Service, Bedford Square, W.C.1. 1947. Pp. 65. Price 1s. 6d.)

It has long been recognised that the degree of civilisation of a nation is indicated by the position it gives to its women; and of course it is pure economics to look after the welfare of the youth of the community for in them lies the nation's future; but nowadays we seem to be developing a fresh ideal.

There is nothing of economics in caring for the aged, and yet the national conscience is becoming more and more alive to the rightness of doing so. For those who are interested in the particular problems that affect the old among us, the new edition of "Old People's Welfare" published for the National Old People's Welfare Committee is a mine of information. It is described as

"a guide to practical work for the welfare of old people." This is no overstatement.

Probably the greatest problem of old age is loneliness, and this excellent handbook goes thoroughly into the way this difficulty may be overcome. It is not sufficient simply to provide an old person with a visitor: what is needed is an understanding friend as well. How to organise old people's clubs or communal meals, and how to bring new interests into their lives while retaining the old, so that they continue to warm both hands at the fire of life, are dealt with in sympathetic detail.

This guide, which contains also a chapter on housing for the aged, another on legislation affecting them, and finishes with an excellent index, can be recommended to all who have the welfare of the aged at heart.

E. K. MACDONALD.

NUTRITIONAL PROBLEMS OF INVALIDS, THE AGED, AND INFIRM. (London Council of Social Service. 1947. Pp. 26. Price 1s.)

This pamphlet is a report of a Conference held in January, 1947. Dr. Avery Jones stressed the importance of the nutrition of invalids and the difficulties that arise when people, especially housewives, are ill at home. He recommended that meals should be supplied to the home and that special meals should be served in Feeding Centres, also that factory canteens should cater for patients with gastric ulcer. Dr. Magnus Pyke discussed the relation of longevity to diet and the food requirements of old people. Miss Rose Simmons discussed the services provided in London and Miss Kathleen Proud the special services in Woolwich. Mr. Le Gros Clark pointed out that many people are lost to industry unless arrangements are made to supply them with special food.

J. R. MARRACK.

THE PRE-NURSING COURSE. Synopsis of Regulations, Suggestions for Syllabuses, Equipment and Books; together with further Recommendations of the Association of Women Science Teachers. (John Murray. 1947. Pp. 44. Price 2s. 6d.)

At first sight the enlarged edition of "The Pre-Nursing Course" appears an improvement on the first edition. Besides giving up-to-date regulations there are suggested syllabuses for arithmetic, biology, chemistry and physics. The book list and suggested practical work has been enlarged.

But are these suggestions, combined with the General Nursing Council's prescribed syllabus of elementary anatomy and physiology and hygiene, either practical or desirable? The whole represents a formidable year's work—without even a central theme. It will allow little time or energy for developing imagination, sympathy and the spirit of service which are surely the underlying causes of young people wanting to nurse and which must ultimately guide every action of the nurse.

FANNY ANDREWS.

LOOK AFTER OTHERS, by George H. Pumphrey. (E. J. Arnold & Son, Ltd., Leeds, 1947. Pp. 93. Illustrated. Price 1s. 6d.)

This new and valuable contribution to health education is an introduction to social health and citizenship. It should appeal to those in Secondary Modern Schools and to Middle School classes in the Grammar Schools. It is not, however, an ordinary school textbook for its use in clubs and youth centres would be provocative of discussion. In addition to chapters describing some of the ways in which health of body and mind may be attained, there are also useful chapters on the health services, a health quiz, the achievements of some good citizens of the past.

P. M. TAYLOR.